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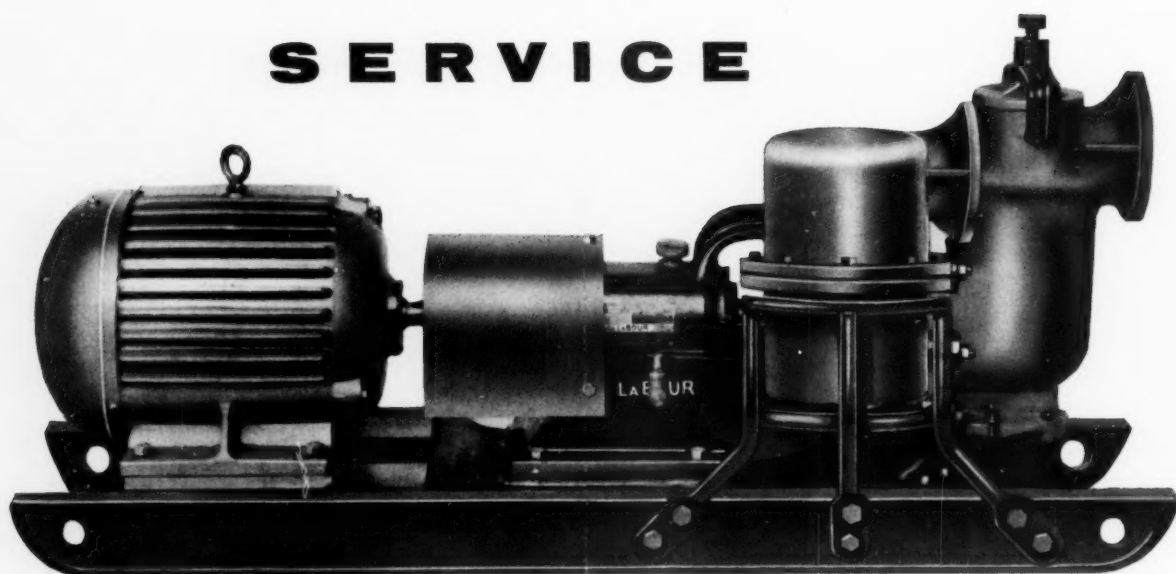
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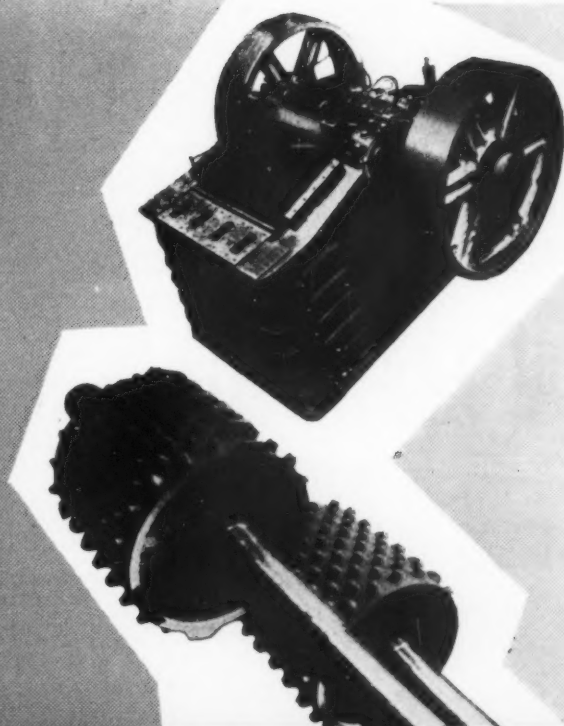


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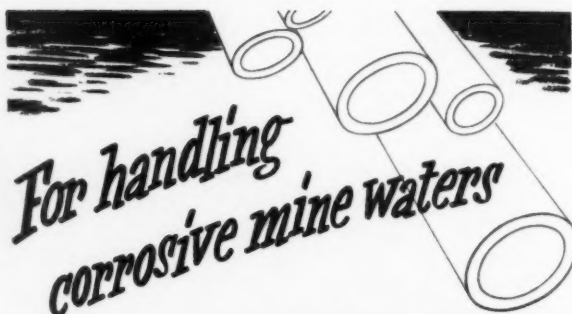
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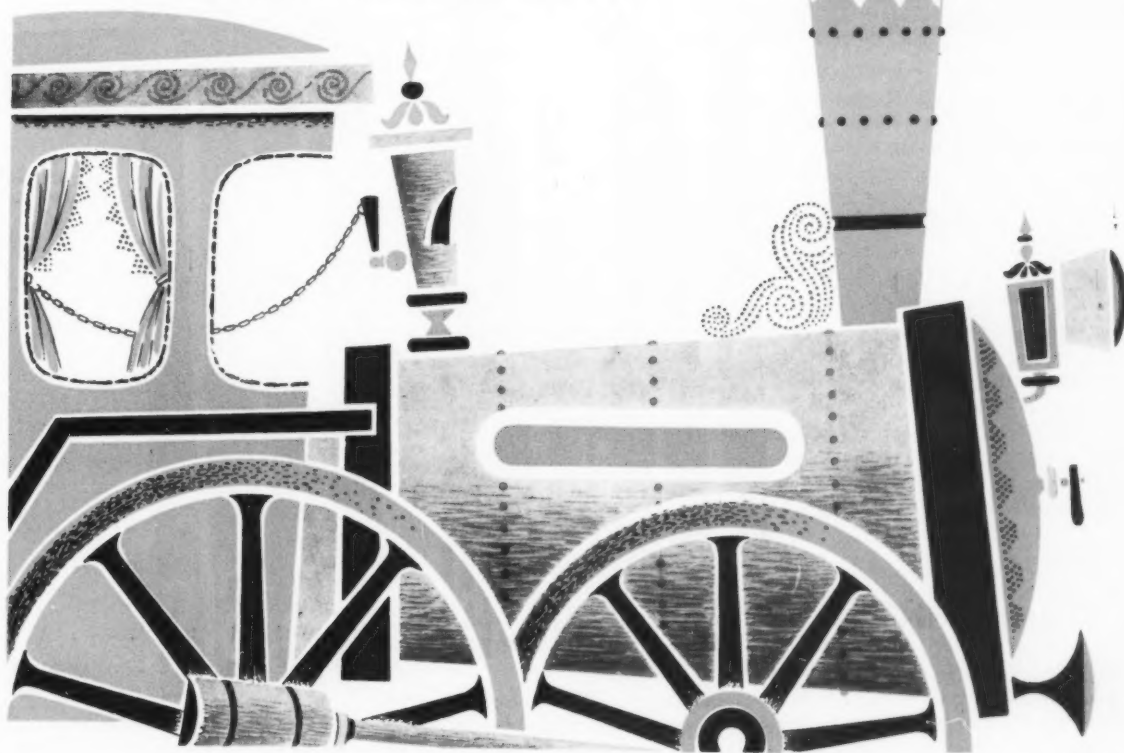
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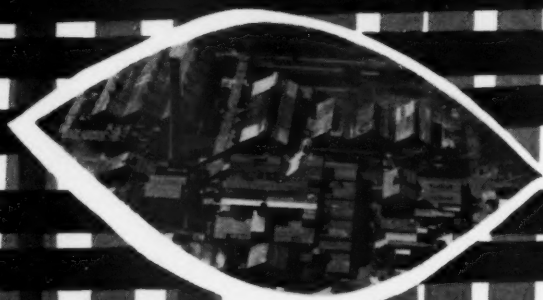
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The Mining Journal

London, March 7, 1958

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Minerals Research in Action

THE need for a fresh approach to mineral resources strategy was stressed at the Symposium on Mineral Resources Policy held in London in September, 1955. One of the suggestions then put forward was that the Department of Scientific and Industrial Research might consider the setting up of a national mineral dressing and process laboratory (or research station), which could collaborate with the Directorate of Colonial Geological Surveys, the Department of Atomic Energy, and the Commonwealth and Colonial mineral development offices, so that promising mineral deposits could be more quickly and more carefully assessed.

An annual reminder of the benefits to be derived by the Commonwealth from a central ore treatment laboratory on the lines envisaged at the London symposium is afforded by the U.S. Bureau of Mines, whose reports give a most impressive insight into the immense scope existing for a national research station of this nature. The Bureau's aims are broadly identical with those of the central laboratory proposal for the Commonwealth. They might be defined, very widely, as the advancement of mineral resources development by evolving beneficiation methods for hitherto unworked deposits, by improving the processes currently employed in the treatment of ores and minerals, and by furthering the extraction of mineral or metal products from waste or dump materials.

In his report on the work of the U.S. Bureau of Mines in 1957, the Secretary of the Interior mentions the following new projects:

Producing high-purity boron experimentally and determining its properties; obtaining basic facts on refractory oxides for ultra-high temperature use, such as jet engine components; developing methods for improving the mineral industries' water supply situation through determining contaminants that interfere with ore-dressing and metallurgical processes and learning how to neutralize them; compiling detailed information on domestic reserves of copper, lead and zinc; studying the practicability of mining anthracite hydraulically; and devising underground mining methods that will increase recovery of domestic reserves of high-grade bauxite.

Among the techniques developed by the Bureau that industry adopted or prepared to adopt during the year were a solvent extraction process for treating uranium ores of the Colorado Plateau; the use of feldspar jigs to clean fine sizes of coal in bituminous-coal preparation plants; continuous pilot-plant tests of a process for separating magnesium and cadmium in magnesium-cadmium-aluminium alloy scrap; and a process for separating columbium from tantalum which was adopted at a multimillion-dollar plant being built at Oklahoma.

A process for upgrading domestic bauxite to make it suitable for producing alum for chemical uses is being incorporated in a plant under construction in Arkansas. The company expects this process to extend its operations in the area for 20 years.

Continuing research projects in which further advances were made during the year involved metals, non-metallic minerals, and solid, liquid and gaseous mineral fuels. They include both technological and economic studies, some being on problems of immediate national need and others designed to anticipate future requirements.

Throughout the year the Bureau collected and analysed information on mineral and fuel production, requirements, and reserves at home and abroad; served as technical consultant to defence agencies; and conducted research on special problems for such agencies. During the Suez crisis, it provided facts used by different agencies in authorizing re-arranged petroleum production and distribution patterns.

Gains were also recorded from studies to increase recovery of ores, coal and petroleum, ranging from research on the basic physics of ground support and breaking rock with explosives to investigations of novel mining techniques that were found to be effective.

Prominent among the year's metallurgical attainments were the development of a method for producing super-high-purity titanium by electro-refining scrap and off-grade sponge and demonstrations that intricate titanium shapes can be produced by casting. Other metallurgical work concerned a wide variety of metals, the objective being to make possible the utilization of lower-grade ores by improving recovery and lowering processing costs.

The work of the U.S. Bureau of Mines cannot readily be evaluated in terms of millions of dollars, but the gains resulting directly or indirectly from investigations undertaken, initiated or sponsored by this national research station must amount to a figure which is truly astronomical.

Collectively, the various government and commercial laboratories in Britain and the Commonwealth cover a very wide and varied field of mining and ore dressing research. Outside the field of atomic energy, however, there is no organization comparable in scope and character with the U.S. Bureau of Mines. This gap in research organization will become increasingly costly as the demands on the Commonwealth's mineral resources become both quantitatively and qualitatively more exacting.

THE SINO-JAPANESE BARTER CONTRACT

The Sino-Japanese steel barter contract signed in Peking on February 26 provides for the sale of Japanese steel products in exchange for Chinese coking coal, iron ore and agricultural produce during the period 1958 to 1962. Under the agreement, Japan is to sell to China £10,000,000 worth of steel products this year, £18,000,000 in 1959, £21,000,000 in 1960, £24,000,000 in 1961, and £27,000,000 in 1962. In return, Japan will buy an equivalent amount of commodities from China.

An official message from the Japanese steel mission states that coking coal will be supplied from North China and iron ore from the Hainan Island, South China. The coking coal offered by Peking is reported to be of better quality than had been expected, with the ash content from 10 to 15 per cent. Prices range from \$11 to \$9 per ton. f.o.b., according to quality. The iron ore offered is 58 per cent content priced at \$7.50 per ton.

It is hardly probable that the conclusion of this agreement will be viewed with approval in Washington, but trade between two neighbouring countries with such complementary interests as Japan and Communist China is as inevitable and irresistible as the waves which Canute tried vainly to stem. The American recession has tended to throw Japan, commercially speaking, into China's arms by making it imperative for her to find new markets for the products of her metal industries. China urgently needs steel products for national reconstruction, and is likely to become an increasingly valuable customer, whom Japanese steelmakers can no longer afford to ignore.

That Japan may have to cut imports of coal and iron ore from other sources because of her new com-

mitments with China is unfortunate but could scarcely be avoided. Her current surfeit of raw materials is, indeed, part of the cost of the American recession, which may well have a significant impact on the pattern of world trade. Already it is causing the industrial countries of the Western Hemisphere—including the U.S. itself—to take a closer look at the potential markets awaiting development beyond the Iron and Bamboo Curtains.

The view appears to be rapidly gaining ground that the resumption of normal trading relations, free from embargoes or inhibitions, between the Free World and the Communist countries can do much to overcome the existing barriers of suspicion and misconceptions, thus representing a major contribution to world peace.

GERMANY'S NUCLEAR PROGRAMME

The Federal Republic of Germany has large reserves of hard coal and brown coal, but despite a continuous increase in extraction, it has been shown that the production of energy from indigenous sources cannot keep pace with the rapidly growing requirements. It has been estimated that energy requirements by 1965 will have reached a figure of 245,000,000 tons (coal units) of primary fuels (including coal, lignite, oil, waterpower, wood and natural gas) compared with 188,000,000 tons for 1954/55 (of which 167,000,000 tons were home-produced).

Coal imports, nearly all of them from the U.S.A., rose to about 23,000,000 tons in 1956 from 10,000,000 tons in 1953. The production of crude oil at present covers only about 30 per cent of the quantities processed in the refineries of Western Germany. The production of natural and other gas is increasing but, in the coming years, it will probably not exceed a relatively small percentage of total gas production. Already about one-half of the country's hydro-electric potential is being used.

From this analysis of Western Germany's power problems, the Export Services Branch of the Board of Trade, London, concludes that larger imports will be needed to meet a deficit in supplies of primary energy and points to the development of nuclear power as a possible solution to the fuel problem.

A target of approximately 6,000,000 kW. of installed capacity in the Federal Republic by 1967 was advocated by the "Three Wise Men" of the European Coal and Steel Community, but this has been condemned as unrealistic by the Federal Government, investment capacity being regarded as a major limitation. Initially, the government are confining themselves to a programme of four or five experimental power reactors with a total capacity of 500,000 kW. to be installed by 1965. These reactors will probably be constructed by four or five groups of German firms, possibly in co-operation with foreign companies.

This experimental power reactor programme is designed to provide information on the technical and financial aspects of various types of atomic power stations, not only to satisfy German domestic requirements but also to win a place for Germany in the world atomic export markets. Its implementation will require some 400 tons of natural uranium, 40 tons of slightly enriched uranium (between 1 and 1.5 per cent), 300 kgm. of 20 per cent enriched uranium, 2,000 tons of graphite, 150 tons of heavy water, 50 to 60 tons zirconium, and about 50 tons of thorium.

The Federal Minister for Nuclear Energy has expressed the opinion that, in view of the similarities in the position of the two countries, any German programme for the construction of nuclear power stations on a commercial scale should be based on natural uranium, as in the U.K. It is, therefore, possible that part of the German requirements

outside the official 500 megawatt programme will be met by the import of complete reactors, possibly of the improved Calder Hall type now on order for the British Central Electricity Authority. It seems more likely, however, that the work would be given to German firms able to build foreign power reactors under licence.

The attitude of the Germany power supply companies to nuclear energy is largely determined by considerations of its cost relative to power derived from fossil fuels. The figure generally quoted in the Federal Republic for nuclear power to be competitive is 4 pfennigs per kWh. (about 0.82d.). The cost of electrical energy from brown coal in Germany (before fuel prices were raised on October 1, 1957) was from 3.5 to 4 pfennigs per kWh. and from hard coal from 4.5 to 5.8 pfennigs per kWh. However, power stations situated near brown coal deposits are said to be able to generate electricity for as little as 3 pfennigs per hour.

The Gewerkshaft Brunhilde in Hanover recently became the first company in Germany to be officially authorized to work and process uranium ore. This company's plans are based on ore deposits at Ellweiler (Kreis Birkenfeld) containing on average 0.1 per cent of uranium. The Federal Ministry for Nuclear Energy has authorized the construction of an ore-processing plant at Ellweiler and has contributed DM.1,000,000 towards the cost. An order has been placed with a Frankfurt firm (probably LURGI) and construction is expected to start in a few weeks. The plant should be operational by September. It is not anticipated that Ellweiler will be able to contribute more than a fraction of the uranium likely to be required for the German nuclear power programme, the project being largely designed to gain experience of extraction and processing methods.

SOUTHERN RHODESIAN ASBESTOS

Rhodesian asbestos mines are stepping up production of lower grade asbestos in a determined attempt to break into new world markets. This follows the encouragement given to the industry by the waiving by the Southern Rhodesia Government of royalties on Grade 7 and Grade 6 asbestos. Waiving of the royalty means an increased profit margin for producers of about 28s. a ton on Grade 7 and about 36s. a ton on Grade 6.

It has been pointed out that this is a great opportunity to break new ground. It makes possible competition with the United States and Canada. There is a strong world demand for lower grade asbestos and prospects are bright for exports to the United Kingdom, the United States, and on a smaller scale to Australia, India and the Continent.

BORON IN CHEMICAL FUELS

Much has been heard in recent months of the dynamic new prospects for boron which are suggested by the development of high energy fuels containing a boron base. At this stage the extent of the potential new market for borax products must remain a matter for guesswork rather than speculation. Nevertheless, some interesting pointers to future possibilities were given at the annual convention of the American Institute of Mining, Metallurgical and Petroleum Engineers by Mr. Donald R. Gibbons, of Arthur D. Little Inc., who stated that boron fuels enable an aircraft or missile to fly 40 per cent faster or further than on ordinary fuels. Initially they will be used in piloted turbo-jets or ram jets and in certain bombers. Being quite expensive, they may be used only during certain portions of each flight—perhaps 25 per cent of the time. This field of development work might lead to new related commercial

applications. Mr. Gibbons therefore advised the mineral industry to follow these developments so as to be prepared for the future and possible opportunities for expansion. Olin Mathieson and Callery Chemical Corporation will have plants to produce chemical fuels in operation early next year.

Mr. Gibbons made the following very interesting estimate, which appears to relate only to the U.S.: "If all the flight tests prove successful and the boron fuels are adopted for operational use by the military forces, one group of high performance bombers—or approximately 30 planes—will be built to operate on these fuels by 1965. If each plane uses conventional fuel 75 per cent of the time, it will require about 3,500 tons of boron fuel. This consumption would generate an annual market for 150,000 tons of B_2O_3 , equivalent to 45 per cent of the current U.S. production".

He added that the use of boron fuels for solid and liquid rockets, and the possible use of other metals, such as beryllium or magnesium, might modify this projection.

POTASH IN SICILY

The World Bank, with the participation of more than twenty financial institutions in Germany, the U.S. and Canada, has made a loan equivalent to \$75,000,000 for industry, agriculture and electric power development in Southern Italy. The equivalent of \$29,400,000 from the Bank's loan has been allocated to industrial projects on the mainland and in Sicily. Most of this allocation will go to three companies for the development of rich potash mineral deposits recently discovered in Sicily. These deposits, which are not yet fully explored, may prove to be among the world's largest and most important.

Two of the projects are in the province of Caltanissetta and the third in the province of Enna. All three include both the development of potash mines and the construction of plants for processing the potash ores into various types of fertilizers. One of the companies is also building a plant for the production of chlorine and caustic soda, thus laying the foundation for the manufacture of heavy chemicals. Sicily's abundant raw materials give promise that this island will be a leading centre for the manufacture of chemicals.

SOUTH AFRICAN COAL

Although South Africa is pre-eminently a producer of gold and gems the Union has a thriving coal industry. In 1957 almost 36,000,000 tons were mined, representing a 40 per cent increase in annual production over the last decade. One of the major problems in the industry has been, and to a lesser extent, still is, inadequate surface railway facilities. About 60 collieries are currently producing in South Africa and with estimated coal reserves of 200,000,000,000 tons the industry is on a sound long-term footing.

Although the quality of the coal is not high the seams are easily worked, being flat and fairly thick. In the Witbank field, which produces over half the country's output, seams up to 50 ft. thick are being mined at depths of 100-500 ft. At Sigma Colliery, one of the latest to come into production, a labour force of 350 non-Europeans and 40 Europeans produce 7,600 tons per day working an 11 ft. seam. In consequence of this high productivity the pit-head price of the coal is 6s. per ton—approximately one-half of the national production cost.

As surface haulage facilities improve and further oil-from-coal plants come into operation, the South African coal industry will doubtless take on an increasing importance in the economy of the country.

CONVEYORS—I

Sequence Control of Mining Belt and Chain Conveyors

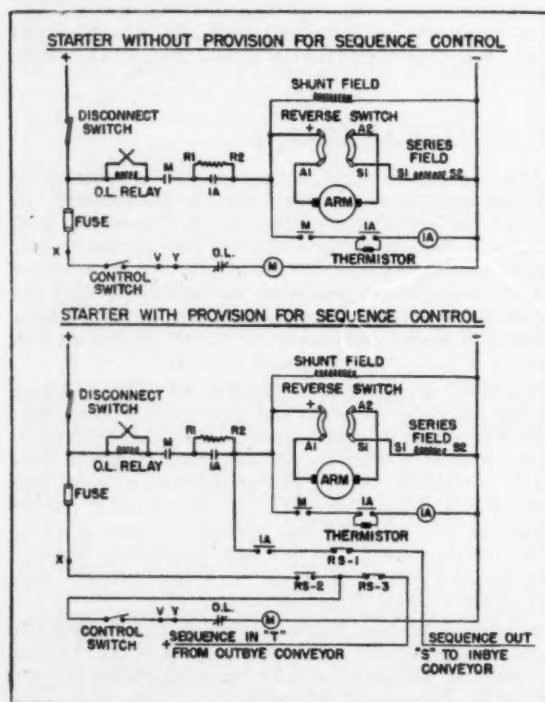
INTERLOCKED sequence control can be applied to any system of conveyors if the controllers for these conveyors have automatic acceleration of the magnetic type. It does not matter if the reverse switch is of the manual or magnetic type, or if no reverse switch is used at all, provided the contactors automatically cut out the resistor after the control circuit is energized.

Rather than give an involved definition, it is preferable to list the requirements that any successful interlocked control system must have. These are: it must be possible to start or stop the system of conveyors from one or more locations; when the conveyor at the discharge station is started, all other conveyors of the system must start in sequence in such a manner that no conveyor can start before the conveyor on which it discharges has started; it should be possible to stop any conveyor in the system and, if desired, run it in reverse independent of the other conveyors. All conveyors discharging on the stopped or reversed conveyor must also stop; when a conveyor is reversed it should automatically be taken out of sequence.

Obtaining Sequence Control

The control switch or push-button station of the conveyor at the discharge or outbye end of the system is generally used to start or stop the conveyors. The control switch for each of the inbye conveyors must be left in "On" position so that the contactors can be energized or de-energized by remote control.

Two methods are in general use in obtaining interlocked sequence control. One method requires stringing a control cable along the belt line and adding electric interlocks to the last accelerating contactor and to the reverse switch.



The increased production per man-hour that has been a trend in the coal-mining industry of the United States for many years has resulted from the combination of continuous mining machines and conveyors. The following article, the first of two instalments, is condensed from a paper presented at the autumn meeting of the American Institute of Electrical Engineers in October last year. The authors are W. F. Roberts and B. Harbage, the latter manager of the mining engineering department of the Jeffrey Manufacturing Co. The paper emphasizes some of the problems involved in setting up a suitable conveyor system and the extracts published will be concluded in a subsequent issue.

This arrangement is suitable for open type equipment but is not approved by the U.S. Bureau of Mines.

The second method is gaining favour because it does not require a sequence control line or extra interlocks in the controller. Also it is approved by the Bureau. Sequence is obtained by using a rotary switch in connection with each inbye conveyor controller.

The sequence control line goes to the various controllers in the conveyor system. The wire labelled "sequence in" is energized by the controller of the outbye conveyor while the "sequence out" control line goes on to energize the controllers of the inbye conveyors.

In the illustration of an automatic starter without provision for sequence control and one with provision for sequence control, the "sequence in" line "T" is energized when the outbye conveyor starts. Current then goes through interlock RS-3, closed in the forward or coal-carrying direction of the reverse switch, control switch, coil M thus closing contactor M. The motor starts with resistor R1-R2 in the circuit. After a few seconds delay the accelerating contactor 1A closes and short-circuits the starting resistor R1-R2.

When the accelerating contactor 1A closes, its normally open interlocks 1A also close. "Sequence out" line S is then energized through one of these interlocks and RS-1 on the reverse switch. Control current then goes on to the next inbye conveyor. Since the "sequence out" line is not energized until the accelerating contactor closes, several seconds delay is obtained in starting the next motor in sequence. This, of course, reduces the peak demand in starting all of the conveyors.

When the reverse switch is thrown to reverse position, the interlocks RS-1 and RS-3 open, while RS-2 closes. Opening of RS-1 and RS-3 de-energizes both the "sequence in" and "sequence out" lines. Closing of interlock RS-2 permits the conveyor to operate independently in reverse with all sequence lines dead.

Rotary Switch

A rotary switch, sometimes called a centrifugal or plugging switch, is used with each inbye controller as an automatic start-stop control switch. Its shaft has a roller or wheel which contacts, and is driven by, the underside of the coal-carrying belt. Normally open contacts close when the belt reaches a predetermined speed in the coal-carrying direction. When the belt speed drops beyond a certain

value the contacts open. The belt speed at which the contacts open and close is adjustable. As an example one type of switch can be adjusted to close at a minimum speed of 70 r.p.m. and a maximum of 200 r.p.m. The minimum opening speed is 40 r.p.m. and the maximum 150 r.p.m. The contacts open at a lower speed than is required for closing.

The rotary switch, for the conveyor it controls, is driven not by its own belt but by the belt which receives the coal. As an example, assume that belts A, B and C are in series and D is a cross-belt discharging on C. Then rotary switch controlling B would be driven by A. Switch for C would be driven by B and switch controlling D would be driven by C.

A time delay between starting of the various belts in the

system is inherent, since the outbye belt must attain a definite speed before the contacts of the rotary switch close and start the conveyor it controls. When the outbye belt stops, the contacts open and the inbye belt stops. Any of the conveyors can be taken out of sequence and run independently by short-circuiting the rotary switch.

Whether a belt conveyor is part of a sequence system or is run as an individual unit, it has an essential safety measure to provide for stopping the belt at any point along its length. This is especially true when men and supplies are handled or when men must cross the belt line. It is not sufficient to have push-button stations 200 or 300 ft. apart, since in many cases the accident or damage occurs between stations. Ability to stop the belt instantly will many times prevent serious injury or damage to equipment.

The Diamond Industry in the Belgian Congo

THE Belgian Congo is the largest producer of diamonds in the world by volume. Its annual output exceeds that of all other countries combined and for the past eighteen years has amounted to some 60 per cent of total world production. In value, however, the Congo only accounts for some 15 per cent of world production, being exceeded in this respect by the Union of South Africa and South West Africa, whose outputs contain a high percentage of gems. The Belgian Congo owes its importance as a diamond producer above all to the fact that for 20 years it has been the principal supplier of a product indispensable to modern industry, and consequently of the utmost strategic value, namely crushing board, which constitutes about 90 per cent of its total diamond output.

In 1956, the Belgian Congo produced the record total of 14,010,455 cts., being an increase of 968,968 cts., or 7.43 per cent, over production in 1955.

The diamondiferous regions of the Belgian Congo are situated in two zones separated by about 500 km.; namely the Kasai zone (Tshikapa) and the Lubilash zone (Bakwanga). Kasai's production includes about 30 per cent of small but high-quality gems, but in the Lubilash zone the proportion of industrials is as high as 97 per cent.

These deposits are all exploited by a single company, the Société Internationale Forestière et Minière du Congo, known as "Forminière". In 1956 this company celebrated its 50th anniversary. It was formed on November 6, 1906, on the initiative of King Leopold II, and with the support of an American group controlled by Daniel Guggenheim and Thomas Fortune Ryan.

The Kasai Deposits

The diamondiferous deposits of the Tshikapa region are alluvial or eluvial and are dispersed over a vast area comprising the basin of the Kasai river and its tributaries: the Luébo, Lulua, Tshikapa and Langatshimo, lying between the 5th parallel south and the frontier of Angola. They are, in fact, an extension of the occurrences in Angola exploited by DIAMANG. For the most part the diamond gravels occur in stream beds, in river flats and elevated terraces, the values being relatively low. Diamonds are also found in the loose state, free of gangue, in gravel rolled from the beds of small streams or on the banks, where the original course of creeks has left a deposit of shingles and gravel. The primary source of the Kasai diamonds has not yet been determined.

Apart from Forminière's concessions, which take up

The source of this article is M. A. Moyar's annual review of the diamond industry, "L'Industrie du Diamant en 1956".

the greater part of the region enclosed by the triangle formed by the junction of the Kasai and Tshikapa rivers, four other companies own concessions in the Kasai zone. These are the Société Minière du Bécéka, in the Lulua basin (between Lulua and Luébo), and the Sociétés Minières du Kasai, du Luébo and de la Luéta. The concessions of the three latter companies comprise a network of creeks, flats and terraces so intermingled that a single organization has been formed to exploit them, namely the Entre-Kasai-Luébo group (E.K.L.).

The Kasai workings closest to Tshikapa have been electrified, but complete electrification has not been possible owing to the distances involved and to the nature of the numerous small scattered deposits. Hence the employment of small semi-portable washing plants.

The concentrates are transported in sealed containers to a central sorting plant at Tshikapa, where recovery is effected by electrical and magnetic separators, batteries of grease tables, and finally by hand.

The Lubilash Deposits

In this zone is situated the Bakwanga mine of the Société Minière du Bécéka, which is the most important known deposit of diamonds in the world; during the Second World War its production was of critical importance to the armament factories of the allied nations. The deposits are grouped for the most part in the vicinity of Bakwanga, where the company's headquarters and central treatment plant are situated.

Up to 1952, exploitation was confined to the detritic, alluvial (flats) and eluvial (hills) deposits extending for several kilometres in the basin of the Bushimaie river, a tributary of the Lubilash, and the Kanshi, a tributary of the Bushimaie. In 1953, a start was made with the exploitation, in addition, of primary deposits (vertical kimberlite chimneys analogous to the celebrated Kimberley pipes).

It was in 1946 that the adoption of modern procedures of geophysical prospecting, using the electrical method, led to the discovery that the zones of surface distribution converged towards deep mineralized breccias, some of which have been followed down to 500 m. Five of these volcanic chimneys have been successfully located in the vicinity of Bakwanga, at points lying almost in a straight line to the

west of the mining centre. In 1955 a new kimberlite pipe was discovered at the source of the Katsha, a tributary of the Bushimaie, and in the following year yet another one was found in the same region, 10 km. further to the east, on the Mpokolo river, a sub-tributary of the Mudiba. In all cases the great majority of the diamonds are industrial stones.

In 1955, the Bureau of Mines, U.S. Department of the Interior, estimated Bakwanga's reserves at 300,000,000 cts. with an average value of 8 cts. per cu. m.

Mechanization of mine production has been practically completed and the greater part of the workings are in operation day and night. Since 1949, some Frs.200,000,000 a year have been spent on equipping the mines and additional equipment is in course of being installed. Le Tournau-Westinghouse earth-handling equipment (Tournapulls and Tournadozers) is used for the removal of barren ground. Enormous extraction machines (believed to be unique in Africa) strip the gravel, which is recovered from a bed of overburden often as much as 20 m. thick. Among the most notable machines are a rotary shovel with an hourly capacity of 400 cu. m. in barren ground (and about half that capacity in gravel), and a bucket excavator of German manufacture 20 m. high, which weighs 659 tonnes and cost Frs.39,000,000, its capacity in barren ground being up to 615 cu. m. per hr.

Forminière

During 1956 Forminière had forty workings in active operation. As a result of prospecting and development, a quantity of diamonds slightly inferior in quality to the average grade of production was added to the reserves. No discovery of economic interest resulted from the joint research organization established by the mining companies in the Kasai region; nevertheless, in the course of this work encouraging indications of alluvial deposits were reported.

Production amounted to 403,335 cts., against 418,686 cts. in 1955, being a reduction of 3.67 per cent. This decline was attributed to a slight drop in the value of the gravels treated.

Forminière's net profit for 1956, derived only partially from diamond mining, rose to Frs.51,696,737, representing an increase of Frs.6,400,000 over the previous year. The Government of the Congo, which owns half the equity, benefited to the tune of Frs.18,400,000 Belgian, apart from Frs.5,901,028 accruing from export duties.

The Entre-Kasai-Luébo Group

The list of concessions jointly exploited by the Société Minière du Kasai, Société Minière du Luébo and Société Minière de la Luéta, having almost come to an end, prospecting operations were suspended at the close of 1956. Moreover, since the search for primary deposits had yielded no favourable indications, the agreement concluded with Forminière and Bécéka in 1954 was terminated on June 30, 1957.

Eighteen workings were active in 1956, against 16 in the previous year, and the combined production of the three associated companies rose to 172,284 cts., being an increase of 5.41 per cent over 1955.

From the reports of the three companies it emerged very clearly that, despite these favourable results, further exploitation would present difficulties, due on the one hand to dwindling reserves and declining quality of the diamonds recovered; and, on the other hand, to the constant rise in general expenses, particularly those resulting from increased salaries and the introduction of a pension scheme for Congo workers which came into force in January, 1957.

Société Minière du Bécéka

This company has intensified its efforts to raise production to a level which will allow it to keep pace with the continually rising demand on world markets. In 1956 it succeeded in increasing its output by almost 1,000,000 cts. as compared with the previous year. Nevertheless, the requirements for crushing board could not be completely satisfied and a further expansion of production facilities is accordingly projected. Nearly 11,000 acres are covered by the company's existing workings, plants, offices, houses for European and African workers, and plantations.

Exploitation is undertaken by Forminière on Bécéka's account.

Bécéka's concessions embrace two groups of deposits of a different type, situated at a distance of 300 km. apart and separately exploited. The more important sector, that of Lubilash, comprises the deposits around Bakwanga. The other deposits are in the Luébo sector, adjoining the workings of the E.K.L. group in the Tshikapa region.

In the Lubilash sector nine mines have been in active operation, yielding a total output of 13,383,508 cts. in 1956 against 12,413,198 cts. in the previous year. The total quantity of barren ground and gravel excavated in 1956 amounted to 4,368,000 cu. m., equivalent to 2½ times the quantities handled in 1946. It is noteworthy that the proportion removed mechanically has risen to 95 per cent from 14 per cent in 1946.

The project to install at Bakwanga a central sorting, washing and concentration plant, intended originally for the treatment of former tailings, has been extended with the intention of providing increased capacity for use in the treatment of material from the current extraction operations. This plant will replace the existing washeries.

In order to meet the requirements for electrical power in the coming years, the problem of increasing the power available from the hydro-electric power stations Young and Tshala is being studied. A research laboratory devoted to the mechanical treatment of minerals has been set up, its objectives being to solve problems associated with the washing and concentration of diamondiferous gravels, as well as the improvement of existing procedures and the application of new techniques.

The search for alluvial and eluvial deposits in the Bushimaie valley has been vigorously undertaken. Recent additions to the total reserves consist solely of extensions to deposits already known and are not keeping pace with the rate of depletion. In the Katsha and Mudiba valleys, however, vast zones have been delimited where prospects of interesting discoveries are regarded as encouraging. Their examination will take several years.

In the Luébo sector, situated in the Kasai zone between the Lulua and Luébo rivers, three workings have remained active. In 1956, production—of the same nature as that of Forminière-E.K.L.—was 51,327 cts., compared with 46,159 cts. in 1955. Prospecting operations in 1956 led to the discovery of alluvial deposits which have more than offset the quantities drawn from the reserves for treatment.

Bécéka's total production in 1956 was thus 13,434,835 cts., which compares with 12,459,357 cts. in the preceding year, and its profit for the year amounted to 402,603,870 Congo francs (Frs.347,361,594 in 1955). From the start of operations up to the end of 1956, this company produced 188,278,274 cts. of diamonds, of which about 97 per cent were industrials or crushing board.

For export purposes Congo diamonds are divided into two categories, those of Kasai and those of Lubilash, which are subject to export duties of 5 and 15 per cent.

“Pok Chau” Mine Operation in Malaya

THE Chinese opencast mines in Malaya account for about 40 per cent of the country's production of tin concentrates. The method employed is to break down the working face by high-pressure monitors. The spoil is channelled to a sump, from where it is pumped up to a palong or sluice-box for primary concentration by gravity. There is a growing use of jigs for treatment on these mines, but only amongst the most progressive miners.

Chinese are traditionally clannish. As is to be expected, the labour employed on these mines is almost exclusively Chinese. The labourers live in dormitories on the mine, whilst their families usually live in a nearby village or town.

In normal conditions Chinese mines operate for 24 hours a day for seven days a week. The labour works in shifts of eight hours each. There is no recognized rest day but most workmen take a number of days off during a month.

The “Pok Chau” System

An important change is taking place in the conditions of employment on Chinese mines. During the past two years or so there has been a continuing trend to turn from a wage-earning system to a system of collective labour contracts, locally known as Pok Chau. Pok Chau has been used by the Chinese for many generations, but hitherto it was uncommon on mines.

The system is particularly appropriate in times when the market price of tin is subject to wide fluctuations, or when the mine is entering poor ground, or times are bad, and the employer may otherwise have to dismiss his workmen. The Chinese have the love of a gamble in their blood, and in such circumstances they are often ready and willing to form themselves into a work gang, and, through one of their number, enter into a contract with their employer under which they will share in the vicissitudes of the mine, taking less when times are bad and more when times are good.

A typical Pok Chau contract will include a sub-lease of the mine by the proprietor to one or more representatives of the labour force who have been appointed to negotiate with the proprietor for the running and maintenance of the mine. There is a provision for sharing the proceeds of the sales of ore between the proprietor and the Pok Chau lessees. The ratio of sharing differs according to circumstances but 66 : 34 is not uncommon.

The proprietor will undertake to provide the requisite engines, and diesel oil, or electric motors, power and equip-

ment, including engine sheds, water pump, water holds, drains, etc.

The proprietor usually agrees to provide the materials, and the Pok Chau lessees the labour, required in the repair or removal of pipes, pumps, engines, engine sheds or other structures or equipment. The workmen's representatives also undertake to bear the cost of maintenance of drains, and water holes and dams. The wages of chargemen, engine drivers and ore dressers, and the cost of food for themselves and the mine manager, appointed by the proprietor, are paid by the Pok Chau lessees.

The sub-leases invariably contain clauses binding the persons working the mine to observe all statutory requirements and regulations, and for the manager appointed by the proprietor to have full power to supervise and instruct in the proper and efficient running of the mine. The contract is usually for a period of six months, renewable or terminable on one month's notice given by either side.

The system is thus one under which the proprietor provides the capital assets and the workmen provide all requisite labour, and the proceeds of the sale of the ore is shared in agreed proportions.

There is no doubt whatever that Pok Chau has kept a number of mines from closing down during the difficult times with which the tin mining industry has had to contend in recent months. It has thus enabled tin to be won in marginal ground which would otherwise have been lost for ever.

Wasting the Ground

An argument used against Pok Chau mining is that the labourers tend to “pick the eyes” out of the ground, and so leave unmined the poorer part of the lease.

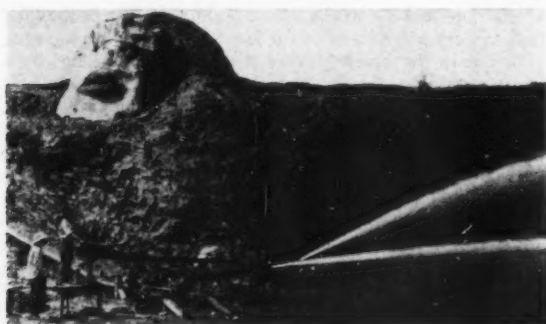
In one Pok Chau mine in Selangor it was reported that in June last the labourers earned M\$535 (£62 8s.) each for 25 days' work, after deducting from each man's share M\$45 (£5 5s.) for the cost of the food consumed. Chinese labourers, whose staple food is rice, feeding communally, can live quite comfortably on an average expenditure on food of about M\$40 per month *per capita*.

The imposition of quota output as from December 15 last, has put most Chinese mines out of gear. Many have reduced overtime working or introduced shorter working hours and shifts. Overtime is an accepted system in Chinese mines, and wage-earning labourers have in the past earned more by overtime than their basic wages. Some miners have notified their workmen that they may have to stop operations in the near future.

In Selangor, the proprietor of a Pok Chau mine gave notice to his workmen to terminate their contract on December 31, as the output quota allotted to the mine was only 70 piculs of concentrates per month, against the average output of 150 piculs. The labourers, however, agreed to reduce their share of the proceeds of sale from M\$26 to M\$21 per picul and the mine is still working.

The peculiar relationship existing between Chinese mine-owners and their workmen has tended to keep these mines free from labour troubles, and trade unionism has made little advance amongst the workers. This position is showing signs of a change. A mine workers' union, formed with the avowed intention of recruiting workers on Chinese mines, is making some headway, and there are indications that the attitude of Chinese workmen towards trade unions is becoming markedly more favourable.

Two monitors in use at the face of a Malayan gravel pump mine



AMERICA'S IRON ORE REQUIREMENTS

NOTWITHSTANDING the recent curtailment in steel production, consumption of iron ore in the U.S. during 1957 is expected to exceed that of the previous year. According to statistics released by the American Iron Ore Association, the quantity consumed during the first ten months of 1957 amounted to 107,652,829 tons, representing an increase of nearly 11 per cent over the corresponding period of 1956. In October, 1957, the consumption of iron ore totalled 10,272,452 tons.

Despite the higher rate of consumption during January-October, 1957, stocks at the end of October were 11,000,000 tons greater than a year earlier. At over 68,400,000 tons, the inventory was equal to more than six months of consumption at the October rate. This increase in stocks reflected an increase of more than 18,000,000 tons in receipts during the first ten months of 1957, to a total of 119,934,464 tons.

Cuts in U.S. Domestic Production

This situation has already resulted in cuts in the production of domestic ore. Thus the Cleveland-Cliffs Iron Co. has announced the curtailment of operations at its Michigan properties, where 175 employees, equivalent to about 5½ per cent of the work force, have been laid off in addition to the normal seasonal lay-offs. The reasons are given as reduced demand for ore by domestic steel mills and increased imports of foreign ores.

According to the latest figures available from the Bureau of Mines, U.S. Department of the Interior, imports of iron ore into the U.S. during the first eight months of 1957 amounted to 21,457,171 tons, being an increase of over 3,000,000 tons from the corresponding period of 1956. Most of this increase originated in Venezuela, but increased shipments were also recorded from Chile, Peru and Canada, the latter including the new Labrador mines. Canada was the largest supplier, accounting for 8,096,637 tons, and was followed by Venezuela with 7,716,408 tons.

In the long-term, the expanding requirements of the U.S. steel industry will continue to provide a growing market for both domestic and foreign ores. Addressing a recent meeting of the American Institute of Mining, Metallurgical and Petroleum Engineers, Mr. Grover T. Holt, assistant to the president of the Cleveland-Cliffs Iron Co., forecasts that by 1980 the steel industry would require about 180,000,000 tons of iron ore, representing an increase of about 30 per cent in approximately a quarter of a century.

For years the Lake Superior district, consisting of the States of Michigan, Wisconsin and Minnesota in the U.S. and Steep Rock and the Michipicoten districts in Canada, have furnished almost 80 per cent of the total North American production of iron ore. During 1956 a total of 77,600,000 tons of iron ore were mined and shipped from the Lake Superior district alone, in spite of a strike in the iron and steel industry of about six weeks' duration.

Mr. Holt emphasizes that the deposits of the Lake Superior district have passed their peak of production. He points out that foreign ores can take up part of this slack, but during peacetime they will provide extremely tough competition for domestic producers, since some of the foreign operators enjoy cheap labour costs which largely offset the more costly ocean haul. Once the Lake Superior - St. Lawrence Waterway is opened, ore from Venezuela, Brazil, Chile, Peru, Liberia and other countries can be delivered by ocean-going vessels direct to Great Lakes ports.

With the dwindling of the high-grade Lake Superior ores, the reserves available to the U.S., which are not vulnerable to enemy action during transportation in time of war, lie mainly in Canada, in localities where the climate is not particularly favourable. Ice on the Great Lakes presents a serious obstacle to transportation in early spring and late autumn, vessel transportation being possible for only six to eight months per year. Canadian production in January-September, 1957, amounted to 17,734,036 tons.

According to Mr. Holt, taconites will gradually replace the domestic high-grade iron ore reserves, which are becoming depleted, along with imported ore. In the future, four blast furnaces using taconite will be able to do the work that five are now doing. In September, 1957, the first taconite pellets were shipped from Taconite Harbour, north of Duluth. The Erie Mining Co.'s commercial taconite plant, costing more than \$300,000,000, was scheduled for completion about the beginning of 1958. It will be capable of providing up to 7,500,000 tons per year of pellets containing about 64 per cent iron. Production will feed Great Lakes steel plants, probably in proportion to their respective ownership of the plant.

Tandem Mines of Toronto has announced a new iron ore smelting process which, it is claimed, may turn into commercial ore large deposits of iron ore now considered valueless because of the titanium content. The process is the invention of Dr. R. A. Halverson, of Detroit. Following laboratory tests carried out at the University of Wisconsin, Dr. Halverson was granted a U.S. patent. It is stated that patents are now pending in Canada, the U.K. and other countries.

Brazil is becoming an increasingly important supplier of iron ore to the U.S. steel industry. A recent survey revealed that large quantities of high-grade Brazilian iron ore concentrates are available at a minimum production cost. Vast deposits of itabirite iron ores are located in the State of Minas Gerais, where nearly pure haematite is currently being mined and exported in lump form. The itabirite, a mixture of quartz and haematite, is regarded as having a tremendous potential, but awaits development of suitable beneficiation techniques for intensive exploitation.

Russia's Immense Resources

Statistics indicate that at present 75 per cent of the world's steel is produced by the Free World countries and only 25 per cent by Iron Curtain countries. The probability that iron ore production in the U.S.S.R. will be very greatly expanded in the coming years is indicated, however, by a recent article in *Pravda*, which states that, according to preliminary figures, in about 15 years' time Russia will produce about 75,000,000 - 85,000,000 tons of pig iron and 100,000,000 - 120,000,000 tons of steel a year. The article points out that, to ensure uninterrupted production on such a scale, iron ore extraction will have to be more than trebled to an annual total of 250,000,000 - 300,000,000 tons. This target is regarded as quite feasible, prospected resources of iron ore in Russia being placed at more than 35,000,000,000 tons, claimed to be equivalent to over 40 per cent of known world resources.

Machinery and Equipment

A Safe Container for Detonators

An efficient and safe container for detonators has always been a problem in mining. Ever-present is a danger factor, averted usually by the experience of the shot-firer, in that metallic containers are subject to condensation troubles and sparking, and leather containers are affected by damp and friction.

A new polythene-nylon detonator box, designed and produced by Godfrey Holmes (Plastics) Ltd. in conjunction with the National Coal Board and I.C.I. (Plastics and Explosives Divisions), now offers greater functional ease and improved safety factors. This detonator box, which is provided with belt loops, has already been approved for use and adopted by several N.C.B. areas.

The box is strongly constructed in high-duty two-tone polythene with easy-clean surfaces, and weighs only 15 oz. without detonators. The nylon lid has a sliding action, self-locking in a central position, and when opened exposes only ten detonators at one time. The lid carries a recess for the employee's number. The brass lock is operated with a standard shot-firing key.

Inside the box there are separate compartments for each detonator, with provision for twenty detonators in all. There is no metallic contact between the inner compartments and the outside of the box. Overall, the Lincoln Imp detonator box measures 2½ in. wide, 5½ in. deep, and 6½ in. long.

The manufacturers claim that the new detonator box is shockproof, virtually indestructible, functionally sound, and economically priced. Extensively tested by shot-firers, it is considered that the unusual safety factors and advanced design will appeal to all industries which employ explosives requiring detonators.

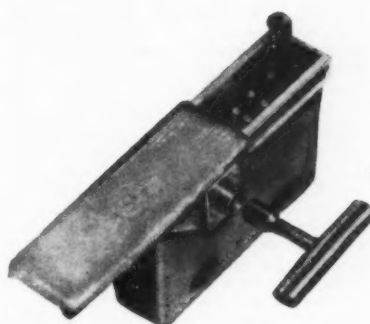
NEW MODEL CRANE

A new 4-ton crane has been added to the range of Jones diesel-mechanical models, distributed in the U.K. by George Cohen Sons and Co. Ltd. The new KL 44B, as its name implies, is a modification of the KL 44, a fast, sturdy crane with a reputation for maintaining its efficiency despite protracted heavy duty under arduous conditions.

Advantage has been taken of the fact that the high operating speeds of the KL 44, while important on such duties as grabbing, are not required by every operator needing a 4-ton capacity machine. By modifying these operating speeds, it has been possible to introduce a less powerful engine while maintaining the same lifting capacity. Up to three crane motions can be operated simultaneously: slew through 360 deg., hoist or lower with maximum loads, and derrick or travel as selected.

DRILL TRANSFORMER PANEL

The necessity frequently arises in collieries of drilling a number of shot-holes in the main roadways for maintenance or other work. In such locations the main



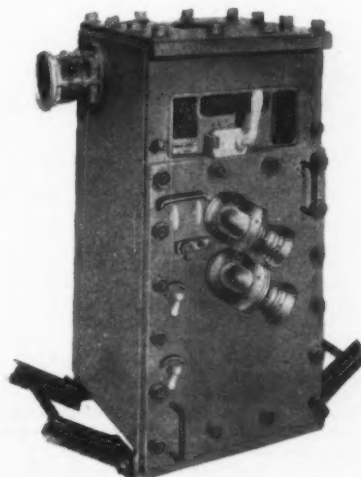
h.t. supply, generally 3,300 v., may be the only supply available, thus precluding the use of the normal drill transformer panel, containing a medium-voltage transformer for operating the 125-v. drilling machines.

In order to be able to use drilling machines, therefore, where only h.t. supply is available, a special panel containing a 3,300-v. transformer, and the necessary 3,300-v. isolator, would be required.

Above: The Lincoln Imp detonator box
Below: The Siemens-Schuckert flameproof drill transformer panel

Such a panel had been produced by Siemens-Schuckert (Great Britain) Ltd., and has been certified flameproof by the Ministry of Power, under Certificate No. FLP 3940. The panel contains a 3½-kVA. 3,300/125-v. 3-phase transformer, star/star, with adjustable tapplings on the h.t. side, and is capable of operating two drilling machines on remote control.

The type number of the panel is DHT-4 and the design follows generally that of the medium-voltage draw-out panel type BDT-4 made by the company.



The isolating chamber is enlarged to accommodate a suitable 3.3 kV. triple-pole isolator and fuses, the handle of this isolator being interlocked with the front cover.

In the lower chamber, the two low-tension circuits are each operated by a triple-pole automatic circuit breaker having time-lag thermal overload trips and instantaneous magnetic short-circuit trips in each phase. The contactors for remote operation of the drilling machines are controlled by pilot relays, energized from a pilot transformer; the pilot circuits have been certified for intrinsic safety under certificate No. I.S. 1046.

Earth fault protection is provided by a relay, the operating coil of which is connected between the l.t. star point and earth. On operation, the relay breaks the contactor control circuits, thus opening the main circuits to the drilling machines.

When required, the drilling machines can be reversed by a rotation reversing switch fitted in each drill circuit.

A NEW TRANSFORMER PLUG

A new transformer plug brings complete safety to operatives working with long-lead electrical appliances. This plug is so compact that it is almost as small as an ordinary plug. Like an ordinary plug, it is plugged into a three-pin socket, direct to the existing mains supply, and steps down current from 240 volts to 25, for safe use with inspection lamps, low-voltage soldering irons, and machine tools. This Dohm Electran Transformer Plug is marketed by the Dohm Group. It has obvious applications in surface installations.

One of the hazards of industry is trailing cable used with portable electrical appliances. Previously the only safeguard has either been to install a costly low-voltage wiring system, or to use expensive and cumbersome transformer units (where the lead between the transformer unit and the power point remains as dangerous as before). The Dohm Electran Transformer Plug gives safety and, indeed, it is so safe that the worker can cut right through the lead connecting the transformer plug and the appliance without the slightest shock. Danger from a wet floor is eliminated, and this means safety for operatives working in wet conditions.

When considering the new plug, it is of interest to recall that almost 800 electrical accidents were reported under the Factories Act during 1956, 40 of which were fatal.

HOISTING BY CHAIN

Herbert Morris, Ltd., have recently described their lever pull-hoists, electric chain hoists, and ball-bearing triple-gear pulley blocks in a series of publications.

These equipments can be visualized as of value in surface installations and in certain instances underground. The pull hoists in particular are interesting in that they have application in confined spaces.

MINING MISCELLANY

Working around the clock to beat the rains, Roberts Construction Co. Ltd. have completed the new headgear for the Mufulira west extension in 10 days, 21 hr. 30 min. The headgear, 132 ft. high, is part of the mine's multi-million pound development scheme.

A grant of £8,000 a year for ten years to the Witwatersrand University, Johannesburg, to establish and maintain a post-graduate school and research unit in economic geology, has been announced by Mr. H. C. Koch, president of the Transvaal and O.F.S. Chamber of Mines.

An offer by the U.S. mining company "Climax" to invest up to \$40,000,000 in a possible exploration of the molybdenum deposits in East Greenland has been turned down by Denmark, reportedly because the Danish Government considered it preferable to provide capital itself for investigation and possible development of the deposits. Investigations will be made this summer and, if the deposits are found suitable for development, the share capital of the Northern Mining Co. will be extended. Denmark has a majority holding in this company, in whose concession the deposits are situated.

It was announced by the parent company, Howe Sound Co., of Salt Lake City, that the Britannia copper mines, British Columbia, would close down on March 1 because of the continuing decline in the copper market. Britannia had been producing at a monthly rate of 5,000 tons of copper content in its concentrate production. The ore was smelted by the American Smelting and Refining Co. Rainville mines, a Quebec copper producer, is closing down its mine completely about the end of March, when milling terminates.

The first shipment of Chilean copper left recently for the U.S.S.R. via Hamburg. Consisting of 258 tons of 5.8 mm. wire, destined for a Hamburg trader, it forms part of a 4,500-ton contract placed with the fabricating company, Madeco. This contract is distinct from the business now under negotiation between Madeco and the Soviet import body, Raznoimport. A further sale of copper wire to Soviet bloc countries is reported by another Chilean fabricator, Cobre Cerrillos. It includes 1,500 tons to Czechoslovakia and 300 tons to China. The price is said to be 2 U.S. cents a lb. higher than the London quotation.

A delegation from the Bamangwato tribe, headed by Chief Rasebolai, and now in London, announce that negotiations have been taking place with Rhodesian Selection Trust in connection with proposals for the grant of a mineral prospecting concession over the tribal areas of the Bamangwato in Bechuanaland. The negotiations have been satisfactory and after discussion with the Commonwealth Relations Office will be continued in Africa.

The National Zinc Co., Bartlesville, Oklahoma, announced that on March 1 it closed down one zinc-furnace block for repairs, equivalent to a reduction in out-

put of 16½ per cent. The plant has six furnace blocks capable of turning out about 3,500 tons of zinc a month at capacity. The company said economic conditions in the zinc industry would determine when the furnace block would start up again.

Le Moyne Ungava Mines Ltd. has announced that it will retain its nickel-copper concessions on the Ungava Peninsula in Northern Quebec, despite the decision of Asarco Nickel Co. Ltd., the wholly owned Canadian subsidiary of American Smelting and Refining Co., not to undertake exploration of the property in 1958. Le Moyne Ungava Mines said that Asarco had spent \$1,050,000 in 1957 on the property, and that 19,000 ft. of diamond drilling had outlined a minimum of 8,000,000 tons of ore, averaging less than 2 per cent nickel.

After six years of intensive prospecting work, Bulgarian and Soviet geologists have discovered a large number of lead, zinc, copper, silver, and cadmium ores in Bulgaria. In particular, some 37 lead-zinc lodes have been found in the three areas of Harmanli, Swilengrad, and Ivailovgrad, and mining operations have started. Total reserves of lead-zinc ore in these areas are placed at about 15,000,000 tons, and it is planned to sink enough mines to support an output of 330,000 tons of ore. A plant with an

annual output of 50,000 tons of concentrate is to be set up.

PERSONAL

The death has occurred of Mr. H. T. Eatwell, managing director and joint deputy-chairman of G. A. Harvey and Co. (London) Ltd. A memorial service will be held at St. Alfege Church, Greenwich, on Tuesday, March 18, at 2.30 p.m.

The death has occurred of Mr. R. Ewing, chairman of the Climax Rock Drill and Engineering Works Ltd., Redruth, Cornwall.

Mr. W. H. W. Rowley, a director of Dominion Reefs (Klerksdorp) Ltd., died on February 20.

Mr. Hervey W. Jones has been appointed a director of Witwatersrand Nigel Ltd.

A general meeting of the Cornish Institute of Engineers will be held at the Camborne School of Mines at 7.15 p.m. on March 14.

Lindsay Chemical Co. will merge into American Potash and Chemical Corp. subject to the approval of shareholders of each company at meetings to be held April 29, 1958.

CONTRACTS AND TENDERS

Three leading Japanese smelters—the Japan Light Metal, Showa Denko, and Sumitomo Chemical Co.s—have signed a contract with the Netherlands Selling Organization Ltd. for the import of 185,000 tons of bauxite from Bintan, Indonesia. Japan at present imports bauxite from Bintan and Ramunia, Malaya. A contract has also been signed between three Japanese aluminium producers and Aluminium Ltd. for Japanese participation in the development of bauxite mines in western Sarawak. The bauxite from Sarawak will go mainly to Japan.

Spain

Manganese ore: Mn. basic 48 per cent (to be rejected if below 44 per cent), SiO₂ 8 per cent, Al₂O₃ 3 per cent, P 0.12 per cent, Fe 1.5 per cent, S nil. Funds authorized \$328,000. Procurement authorization No. 52-6507-99-L1-8203 (Sub-authorisation No. 8203-1). Issuing authority: Consejo Ordenador de Minerales Especiales de Interes Militar, Genova, 13, Madrid. Closing date: 20/3/58. B.O.T. Ref.: ESB/5783/58/ICA. Telephone enquiries to Chancery 4411, extension 354.

The following future authorizations have been announced by I.C.A.:

	Contract Period	Terminal Delivery Date	Amount (in U.S. dollars)
<i>Spain</i>			
Miscellaneous Industrial Non-Ferrous Metals and their Products (PA 52-696-99-L1-8207)	31/1/58-31/8/58	28/2/59	100,000
Manganese Ores and Concentrates (PA 52-6507-99-L1-8203)	31/1/58-31/8/58	28/2/59	400,000
Aluminium and Aluminium Base Alloys and Aluminium Products (PA 52-691-99-L1-8205)	31/1/58-31/8/58	28/2/59	1,500,000
Primary Forms, including Scrap (PA 52-6921-99-L1-8206)	31/1/58-31/8/58	28/2/59	4,000,000
Ferrous Scrap (PA 52-6603-99-L1-8204)	31/1/58-31/7/58	31/1/59	1,000,000
<i>Vietnam</i>			
Coal and Related Fuels (PA 30-610-99-L1-8284)	31/1/58-31/7/58	31/1/59	600,000
Non-Metallic Minerals (except Petroleum) and Non-Metallic Mineral Products (PA 30-640-99-L1-8285)	31/1/58-31/7/58	31/1/58	500,000

B.O.T. Ref. ESB/5160/58/ICA. Telephone enquiries to Chancery 4411, extension 354.

Metals and Minerals**Aluminium Producers Expect a Record Year**

Shipments of mill products by the U.S. aluminium industry declined by 7½ per cent last year, while pig and ingot shipments for other purposes were 3½ per cent lower, according to preliminary statistics compiled by the Census Bureau. On a tonnage basis, shipments of mill products totalled 1,333,990 tons during 1957, as compared with 1,442,400 tons during the previous year. Shipments of aluminium pig and ingot for uses other than for processing into mill products, including casting and for export, fell to 588,275 tons from the 1956 total of 611,740 tons.

Yet despite this setback, and in the face of the uncertain outlook for the immediate future, the U.S. aluminium industry expects demand for its products to rise substantially during 1958 and 1959. Predictions in some quarters that the market might be burdened with an over-supply of aluminium for any substantial period ahead have little justification, states Mr. John Krey, vice-president of the Reynolds Metal Co. Mr. Krey told the New York Society of Security Analysts that producers were adjusting output to conform to foreseen demand. "Given a stable economy", he declared, "we can look forward to customer demand exceeding the total of 3,000,000 tons a year in 1960 and 5,000,000 tons a year by 1965".

Reynolds's own production problems will be eased by the completion of arrangements under which the Bonneville Power Administration will transmit over its lines, power supplied by the California Oregon Power Co. to the aluminium smelter at Troutdale, Oregon. The signing of this contract relieves the interruptible power problem at Troutdale, which in the past has caused some curtailment of output. Reynolds has become the largest industrial user of private power in the area.

An important new source of supply will become available to the U.S. in the early summer, when Olin Mathieson Chemical Corporation expects to have its major aluminium facilities—most of which are jointly owned with Revere Copper and Brass Inc.—in operation. When fully completed, the entire project will have cost around \$400,000,000.

Elsewhere in the world new projects for the production of primary aluminium continue to be announced. The private financial company "Petrofigaz" has floated a loan of 9,000,000,000 frs. to finance the building of an aluminium plant, using as power natural gas from the deposit at Lacq in south-western France. This project—the first to use the Lacq gas for industrial purposes—aims at adding another 75,000 tonnes by 1960 to France's aluminium output, which is currently at the peak capacity of 160,000 tonnes annually. Of this, 50,000 tonnes will be produced by a plant now under construction by Pechiney near Lacq, and 25,000 tonnes in the Pyrenees by increasing the capacity of Ugine's Lannemezan plant. The Lacq gas will be sold at a very low price so that aluminium can be produced on competitive terms. The new output will help to meet higher domestic consumption, which is expected to reach

220,000 tonnes by 1961 and 280,000 tonnes by 1965.

Petrofigaz was formed by the banks, Unione Européenne Industrielle et Financière and Banque de Paris et des Pays-Bas, the French Gas Corporation, a number of other banks, Compagnie du Canal de Suez, Pechiney, Ugine, and other industrial companies.

In India, the Bombay Government is examining the possibilities of setting up an aluminium plant of about 20,000 tons annual capacity near Kolhapur, in Bombay State, where plentiful bauxite deposits have been located. The State Government has already approached the National Planning Commission to include this plant in the public sector in the second five-year plan. The government, which is very anxious to develop an aluminium industry, would be prepared to consider private enterprise setting up the plant, if financial and other limitations made it impossible to take up the project in the public sector.

The aluminium plant which it is proposed to set up in Madhya Pradesh may be located either in Katni or Amarkantak. Technicians of India's Central Government are expected to conduct a detailed survey before final selection of the site. Amarkantak has been recommended as the most suitable site by M. Sabot, a French expert, who recently conducted a detailed survey of the bauxite areas in this State.

Meanwhile, Ghana has by no means abandoned hope of the Volta River project, on which Dr. Nkrumah has set his heart. Talks have been started at Accra between Mr. M. B. D. S. Pernes, a director of Alcan, and representatives of the Ghana Government. This meeting follows Dr. Nkrumah's approach to President Eisenhower, and is intended to inform the interested aluminium companies of the latest financial moves and ascertain their own views on the scheme.

The Soviet Union has opened a credit equivalent to \$25,000,000 for work to be carried out this and next year on the aluminium plant to be built in Montenegro. The total cost of Yugoslavia's ambitious scheme is put at the equivalent of \$175,000,000.

On the marketing side, it is noteworthy that anodized aluminium with an etched finish is to be used for the metal skin of the new Chase Manhattan Bank head office building now under construction in New York. The basic aluminium for the skin, amounting to more than 1,750 tons, will be supplied by Alcoa.

New markets for aluminium are expected from a die-casting alloy with built-in structural strength, which has been made available for the first time by Alcoa as the result of a three-year study. Tin, lead, and cadmium in the alloy provide a combination of good casting characteristics, mechanical properties, and bearing qualities, and also improve machining characteristics. The new alloy will withstand loads of 1,500 p.s.i. and will find its first commercial applications in connecting rods for air-conditioning compressors.

INDIAN MANGANESE

While weakness and dullness have characterized manganese ore markets in the U.S. during the past month, the feeling among many importers is that prices will probably dip no further owing to the barter deal being negotiated for American surplus edible grains against Indian manganese ore. Approximately 600,000 tons of ore are believed to be involved.

It has been stated that ore offered by India would average 42 per cent Mn, whereas originally ore of lesser average content had been offered. It has further been indicated that the State Trading Corporation has no intention of opening offices in the U.S. or of securing agents to sell ore in that country. Neither will the S.T.C. take business away from U.S. importers or importers in other countries. It would not by-pass regular manganese trade channels in India. However, if consumers desired to purchase directly from the S.T.C., they could do so.

LITHIUM PRODUCTION CUT

The Southern Rhodesian producer, Bikita Minerals Ltd., has announced that its mine is to cut production of lithium ore by about 40 per cent. The main reasons for the cut, it was reported, are that treatment plants at the mine and at San Antonio, Texas, have proved more efficient than expected and therefore require less ore, while industries in the U.S. and elsewhere are not using as much lithium as originally anticipated.

On the completion of two research projects and a monograph on lithium, the American Lithium Institute is to cease operations. Its functions will be assumed by the Manufacturing Chemists' Association, which is now accepting for membership firms working within the reactive metals field. Two of the Institute's members—American Potash and Chemical Corp. and the Foote Mineral Co.—are already affiliated with the M.C.A. The third Institute member, Lithium Corporation of America, has asked to join the Association. Since the interests of the three firms extend beyond lithium itself, it is felt that they can be served by the broader scope of M.C.A.'s overall programme.

A working agreement designed to lead to the commercial development of new lithium-containing metal alloys has been reached by Lithium Corporation of America Inc. and Brooks and Perkins Inc., of Detroit. Both companies are to participate in research on joint account. Additionally, Brooks and Perkins will prepare special lithium alloys and carry out metallurgical research under contract for the Lithium Corporation account alone.

TITANIUM PIPING SYSTEMS

Increased use of titanium for non-defence industrial piping systems, stemming from the slowdown in aircraft orders and increased productive capacity,

is forecast by Tube Turns, of Louisville, Kentucky—a division of National Cylinder Gas Co., Chicago—which is the leading U.S. producer of welding fittings and flanges. The company has announced plans to offer a complete line of welding fittings and flanges of commercially pure grades of titanium to match every schedule and size of titanium piping now in production. This decision reflects the development of improved forging techniques, declining costs of titanium, and encouraging sales forecasts. Now that titanium is more widely available, it was stated, many industries—notably chemical processing, anodizing, petroleum, marine, and food processing—are actively developing commercial uses of strong, light-weight, corrosion-resistant titanium piping.

TUNGSTEN INVESTIGATION SUSPENDED

The U.S. Tariff Commission has discontinued an investigation of tungsten ores and concentrates. The study was requested by the Senate last August and was intended to show the differences in the costs of producing tungsten ore and concentrates in the U.S. and in foreign countries. In announcing its decision to discontinue the investigation, the Tariff Commission said that, owing to the highly abnormal and extraordinary developments which had affected the tungsten industries of all the free world countries

since 1950, it was impossible at this time to obtain information on either foreign or domestic costs that would be representative of normal operations.

Last month the House Appropriations Committee proposed that contracts for tungsten exploration be removed "because this mineral now in the stockpile, is far in excess of what would be considered mobilization requirements". The report stated that the committee could see absolutely no justification for additional expenditure of Federal funds for this purpose and directed that no additional tungsten contracts be approved.

SIBERIAN DIAMONDS

It is claimed that "dozens" of diamond deposits, Kimberlite pipes, and diamond fields have been discovered in the basin of the Siberian river Aldan, in the south-eastern part of Yakutia. The report states that, according to preliminary estimates, the new area appears to be as promising as the diamond-bearing area in western Yakutia. These finds are regarded as confirming the assumption that the Siberian layer is diamond-bearing over the whole length of its territory.

ASBESTOS DELIVERIES RISE

Deliveries of asbestos from Canadian mines rose in 1957 to 1,048,084 tons from 1,017,848 tons in the previous year.

There are growing complaints from the Far East about the effects of the buffer scheme, but nothing has yet been said which would indicate that any steps are contemplated to relieve the situation. In fact, the Malayan Tin Producers' contributions to their government in connection with the Tin Agreement are increased for the month of March to \$21 (Malayan) per picul, as against \$12 for the preceding period. Rumours have been prevalent about additional action being taken by the Indonesian authorities against the Billiton Co., and it is hoped that the International Tin Council may have something to say on the subject of the Indonesian tin industry in general. On Thursday morning the Eastern price was equivalent to £753½ per ton c.i.f. Europe.

LEAD-ZINC BACKWARDATIONS

The lead market has remained with a very firm undertone and cutbacks appear to begin to be taking effect, as the U.S. Bureau of Mines shows that during 1957 the lead recovered from domestic mines decreased to 333,500 s.tons against 352,800 in 1956. The interesting factor is that during the first four months of 1957 output was at a higher average monthly rate than for 1956, whereas the average output for the remaining months was considerably lower.

In O.E.E.C. countries also the production of lead in January, 1958, at 48,154 tonnes was 7 per cent below the December figure and 8 per cent below that for January, 1957. In America, the G.S.A. once more bought 5,000 tons for stockpiling purposes in February. The backwardation on the London market continues, as it is believed that there is very little prompt lead available at the moment owing to recent shipments to America.

The zinc market has also been relatively inactive, although in this metal a very much firmer undertone has developed, probably helped by news of additional cutbacks in production in America. The contango which developed at the end of last month has once more given way to a backwardation and it is probable that this picture will be repeated at fortnightly intervals for some months.

The G.S.A. purchased some 7,000 tons of zinc in February, which is below the tonnage which has been taken in any recent months, and this may indicate that money is beginning to run short. If this is so, it is to be expected that the Tariff Commission's Report will be presented in the not too distant future.

Closing prices are as follows:

	Feb. 27		Mar. 6	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash ..	£160½	£160½	£166	£166½
Three months ..	£161½	£162	£168½	£168½
Settlement ..	£160½		£166½	
Week's turnover	7,375 tons		10,875 tons	
LEAD				
Current ½ month	£73½	£73½	£75½	£75½
Three months ..	£73½	£73½	£75	£75½
Week's turnover	3,800 tons		3,025 tons	
TIN				
Cash ..	£731	£731½	£734	£735
Three months ..	£735½	£736	£740	£741
Settlement ..	£731½		£735	
Week's turnover	1,250 tons		735 tons	
ZINC				
Current ½ month	£61½	£61½	£64	£64½
Three months ..	£62	£62½	£63½	£64
Week's turnover	4,575 tons		3,775 tons	

London Metal and Ore Prices appear on inside back cover.

COPPER • TIN • LEAD • ZINC

(From Our London Metal Exchange Correspondent)

The week under review has been singularly devoid of any outstanding feature, although the general undertone of markets has once more steadied up, possibly on some credence being given to President Eisenhower's prognostication that the decline in the American economy will be stopped in March.

COPPER IN MORE DEMAND

More interest has been taken in the copper market during recent days, and the London quotations have remained firm in spite of the continued shakiness in the American price structure, where there is still a 2-c. gap between producers' quotations and those of customs smelters, with dealers tending to offer the material at slightly below the latter's price.

No further news has been received about the reported negotiations by Russia for the purchase of copper wire direct from Chile, but it is now being realized that, providing the order is placed somewhere, the consumption/production picture will benefit.

Further shutdowns have been reported during the week, especially from Canada, and additional indications have become apparent of a need to purchase amongst European buyers. This latter factor, combined with the gradually accumulating effects of cutbacks made last autumn, should give rise to steadier markets over the next few weeks. As has been said before, if there is to be an autumn recovery, there must be some temporary improvement during the spring as, especially since they re-opened, metal markets have shown themselves an exceptionally

accurate pointer to the probable development of the general economy six months ahead.

The "black spot" is still the American situation, where it is understood that February deliveries by brass mills will be as much as 20 per cent below those of January, with business being described as the worst for twenty years.

STRAITS PREMIUM FALLS

The tin market is marking time during the present meeting of the International Tin Council, about which a communiqué will be issued before the week-end. Informed opinion considers that only matters of a routine nature are being discussed, and there will be nothing done to alter the present position of the metal.

The premium for Straits tin above the London quotations has fallen considerably, and it is expected this development will continue through the gradual increase in the London three-month quotation. At the moment a reasonable contango is developing, and it is difficult to foresee the probable course of the cash quotations over the next few weeks. Some observers feel that the buffer stock manager may still have to absorb a further small tonnage before the whole market begins to move upwards.

The slowing down of shipments from the Far East is shown by the figure given for February shipments from Singapore and Penang, which reveals that, although exports through the former port were virtually unchanged, those through Penang showed a decrease of about 1,800 t.ons.

Mining Finance

Chartered's Built-in Stabilizers

With a drop in gross consolidated profits from £14,625,678 to £10,937,892 in the year to September 30 last, the British South Africa Co. (Chartered) followed the trend of the source from which most of its profits are earned, the Rhodesian copper companies. In fact, the key item in Chartered's accounts, "royalties, rents and fees from mining" fell by about 30 per cent to £8,758,252.

In consideration of Chartered, however, two points are very often overlooked. As a normal practice, Chartered pays out as dividends a comparatively small proportion of its earnings. Thus in 1956, of a net profit of £7,010,460 carried to appropriation account, only £2,644,577 was distributed, the remainder being placed to reserve with the exception of a small amount attributable to outside shareholders in a subsidiary. This conservative policy is an undoubtedly wise one in view of the reversion to the Rhodesian Government of the company's mineral rights (involving the cutting-off of Chartered's royalty payments) but no small degree of flexibility is allowed thereby. It may be imagined, therefore, that in view of the comparatively long time-scale involved, Chartered may well prefer to keep its payments on a fairly stable basis by drastically cutting back its reserve-building in lean years with the hope of making up lost ground in the red metal's more propitious times. This has certainly been the case this year, for the dividend appropriation is only down by about 15 per cent, while the reserve appropriation this time is only a little over half last year's after allowing for the 1956 cut in the carry-forward.

The other factor stems from the question of reserve-building. Chartered's aim is, of course, to have a strong investment portfolio by 1986 in order to make the transition from one income source to another as gently as possible. This policy was actively pursued in 1957, and the total book value of Chartered's investments stood at £25,670,141 last September, compared with £21,452,759 twelve months previously. What is noticeable about the portfolio is that Chartered's eggs are by no means all in a copper basket. Of the total, about 70 per cent by book value are outside copper mining. More than one-third of this 70 per cent is invested in "other mining companies", which in turn covers a Kaffir portfolio with a market value of over £7,500,000, the major part of which is in the Gold Fields and Anglo American groups, both of which are organizations with a preponderance of new, young producers. The importance of this holding in present circumstances is considerable, since it is probable that many of the mines in the portfolio had not paid a dividend (or at best only tokens) when the 1957 accounts were closed, while most have made maiden or increased distributions since. At the moment, this income is a minor part of Chartered's revenue, but should the recession in copper continue it could well become a most significant factor.

MORE GOOD VALUES AT ASHANTI

It may now be taken as proved beyond all doubt that the Main Reef at Ashanti Goldfields' property persists strongly at depths beyond those previously explored.

The latest monthly development report from this producer announces disclosures as high as 68 dwt. over 12 ft. on the Main Reef at levels down as far as No. 38, until recently the effective bottom of the mine. Interest in the February report, however, centres round the excellent disclosure of 28.4 dwt. over 8 ft. on the 41st level, a new depth presumably made possible by the availability of facilities at the new Eaton-Turner shaft.

Profit for February came out at £105,396, making a total for the first five months of the financial year of £529,264 against £536,000 in the corresponding period of last year.

CONSOLIDATED MINES SELECTION SELLS HARTIES

The question asked in this column last week of whether the large increase in income under the "miscellaneous" head in the preliminary results of Consolidated Mines Selection was due to any major portfolio re-adjustments or merely the result, marketwise, of grasping the nettle while the iron was hot, is answered this week by the full report.

In fact, the increased income is due to a combination of the two factors. The bulk of the rise of £67,000 is accounted for by share realization, the report discloses, and this was helped by the selective improvement in the Kaffir market in the second half of last year. At the same time, the portfolio has received a minor reshuffle involving, among other things, the sale of the holding in Hartebeestfontein and the acquisition of a stake in the S.W.A. Co. It appears also that Consolidated Mines Selection is participating in the portion of the Western Deep Levels loan nominally attributable to Anglo American. This could become a most useful interest in the future.

It is worth noting, when reading the statement by the chairman, Mr. A. C. Wilson, extracts from which appear on p. 277 that, at the present price of around 35s., £1 invested in C.M.S. buys an interest (at book values which are, in turn, the lower of cost or market values) of approximately 25s. in a very sound and well-spread portfolio.

ANOTHER WEST AFRICAN RECOVERY

Ariston Gold Mines is the latest West African gold producer to announce sharply improved results for the year ended September 30, 1957. Like Konongo's report last week, the 1956 figures were severely affected by the 34-month strike of African mineworkers, but

unlike Konongo, the 1957 figures do no more than restore the position to normalcy.

The gross profit for the year, after deducting operating expenses but before taxation and appropriations, was £375,865. This compares with £50,316 in 1956 and £380,452 in 1954-5, the last full year before the strike. This is not an entirely satisfying result in the face of Ariston's steadily improving mill grade, which has risen from 5.6 dwt. per ton in the two months preceding the strike to 6.5 dwt. in the last quarter of the 1957 financial year. The full report and accounts, to be published today, will, no doubt, clarify the position, but the culprit would appear to be rising costs.

There is more cheer for Ariston holders in other sections of the report. The final dividend recommended is 1½d. per unit, making a total of 3d. for the year against 1½d. last year and 3d. in 1954-5. In addition, Ariston has declared an interim dividend and bonus totalling 6d. per unit for the period until September this year, when Ariston hopes to acquire O.T.C. status.

The meeting will be held in London on April 1.

KONONGO'S SEARCH FOR REEF

Konong Gold Mines has now published its full report and accounts for the year to September 30 last year. The financial results of the company were noted in these columns last week, and it is only necessary to add that the explanation of the good increase in profit is as was conjectured at that time.

The interest of the report lies, therefore, in the technical data, and it must be said that this makes less cheerful reading. At the year-end Konongo's ore reserves were equal to three years' milling at the present rate. This in itself is satisfactory, but the fact that the year saw further declines in tonnage, value and width is not so.

Development is, of course, the key. That the mine's technical consultants, Gold Fields, are aware of the situation is apparent from the fact that footage advanced last year was substantially higher than in 1955, the last comparable year. This effort however, is not being repaid with tangible results. Doubts still surround the persistence of values at depth, payable and unpayable sections occurring unpredictably.

There is, however, a hopeful sign at shallower levels. Horizontal diamond drilling on the 8 and 9 levels of the Boabedroo section have disclosed a zone some 70 ft. wide, in which values appear sporadically. The significance of the mineralized zone has yet to be determined, but it appears that development is proceeding in that area at the present time. Possibly Konongo's next quarterly report may carry some more definite information.

LYDENBURG PLATINUM'S NOBLE FUTURE

The fortunes of Lydenburg Platinum depend almost entirely upon the profitability of Rustenburg Platinum, for, although the company has holdings in Blinkpoort Gold, F.S. Geduld and Virginia, these are insignificant beside the 26 per cent interest in Waterval Platinum, which in turn owns 39 per cent of the equity of the producing company.

In common with Rustenburg, results for the year ended August 31 last were by no means unsatisfactory, although net profits were somewhat down on the record 1956 figures, resulting in a final dividend of 14.75 per cent which reduces the total for the year to 23.5 per cent. However, in present circumstances, interest in Lydenburg must be focused more on the future than on the past, and in this connection, Mr. C. S. McLean, the chairman, reiterated in his speech from the chair the point that Mr. D. A. B. Watson emphasized when addressing Rustenburg shareholders: that, however gloomy the short-term view for platinum may be, there is nothing to indicate that the long-term future for the metal is anything but good.

Mr. McLean's statement appears on p. 277.

RAND AND O.F.S. RETURNS FOR FEBRUARY

Within the limited extent to which the South African gold mining industry is seasonal, the first two months of the year are the off-season. This factor, combined last month with the fortuitous effect of a short working month, and even the slightly higher price assumed for the metal, could not prevent the overall picture from being grey, with comparatively few highlights to relieve it.

One of these few highlights was, as usual, Buffelsfontein, of the General Mining group. In spite of higher costs, this young Klerksdorp producer, with barely a year's production behind it, reported another new record in profits from gold and uranium, the gross total coming out at £326,001.

Only three mines in the Anglo American group were able to increase their earnings last month. P. Brand, Welkom and, unexpectedly, W. Reef. At the latter property the improvement was directly

attributable to a £9,000 rise in net uranium profit, but lower costs were the primary factor at the two former mines.

Among Gold Fields producers only Vlakfontein and W. Driefontein managed to do more than hold their own, and it is noteworthy that W. Drie's increase was achieved in the face of a slight decline in grade. It could be that increasing development in the less rich areas of the mine is now beginning to have its effect on mill yield. The Central Mining picture was similar, with only Harmony to provide cheer by increasing the total of gold and uranium gross earnings from January's £232,923 to £245,540.

Elsewhere, Hartebeestfontein's grade was held steady at 11 dwt., but a rise of 1s. in cost per ton forced profits down albeit marginally, while a 9d. cost rise at St. Helena was only partly compensated for by an increase in grade.

Our usual table of returns appears next week.

REDUCED COPPERBELT PAYMENTS

Interim dividends announced yesterday by Rhokana Corporation and Rhodesian Anglo American both show the reductions expected in view of the continuing weakness of metal prices.

Rho-Anglo is paying 1s. This compares with last year's interim of 1s. 6d. and a final of 5s.

The Rhokana payment is even more severely reduced. At 5s. per unit, the distribution is only half of the equivalent payments last year, which closed with a final of 40s.

Utrecht Colliery.—Welgedacht Exploration took over the Utrecht Colliery on February 1, all suspensive conditions having been fulfilled.

Tanks And The Tax-Man.—Tanganyika Concessions have been notified that, to be effective, applications for the 100 per cent tax relief applicable to dividend No. 15 (paid in July, 1952) must be made before April 5, 1958.

Gold Fields Australian.—Application to the High Court for permission to make a capital repayment of 1s. per share is being sought by Gold Fields Australian Development Co. Shareholders' approval was given on February 27.

Anglo-French.—The report of Anglo-French Exploration will be posted on March 10, and the meeting held on April 2. Results for 1957 were marginally better, and the dividend to be recommended is unchanged at 1s. 10½d. per share.

Mount Charlotte Offer.—At an E.G.M. to be held on March 10, resolutions will be submitted to shareholders of Mount Charlotte (Kalgoorlie) Gold Mines providing (*inter alia*) for the conversion of certain shares to facilitate the completion of an offer to Hampton Plains Development, an Australian investment company.

Nigel Van Ryn Pays Same.—Results of Nigel Van Ryn for the year ended September 30 last were slightly up on the previous year, with a net profit coming out at £28,766 against £25,492. An unchanged dividend of 4½d. per share is recommended.

Bisichi Offer For Naraguta Extended.—Bisichi Tin Co. (Nigeria) is negotiating with Naraguta Extended Areas for the purchase of the whole issued capital of the Naraguta company.

MARKET HIGHLIGHTS

While London stock markets generally wilted in the chill winds that blew from the direction of Wall Street, it was springtime in the Kaffir market during the week to March 5. Shares of older gold producers which had laid dormant for many weeks past, suddenly blossomed forth as investment demand disclosed the general shortage of stock available.

While share prices recorded a solid advance, there were few dealers who could say that they were overwhelmed with business. Even so, the business was of the genuine small investment variety and the daily number of small bargains moved quickly above the 500 mark.

It would not be true to say that there were no speculative buyers interested in taking a quick shilling or so profit in the account, but the proportion of this type of deal was much less than had been the case in earlier gold share revivals. This was just as well because when Wall Street rallied and the speculative element departed to try their luck in oil shares, their going from Kaffirs was marked by only a small turndown in prices and activity, both of which soon picked up.

Nearly every stock in the list notched up a few pence in last week's gold share rise, but among the more outstanding movements were gains of over 1s. or so in City Deep (up to 15s. at one time), Crown (22s. 6d.) and West Rand Investment (25s.). Newer mines improved but provided no real highlights, especially when it was found that the February profit returns were generally colourless. Buffelsfontein returned a record profit but the shares had already discounted this with a rise to 39s. 3d. and following the news they eased slightly on profit-taking.

Elsewhere, Diamonds were firm with U.S. interest being seen in De Beers (95s. 7½d.). Anglo Trusts advanced to 153s. 9d. Platinums responded to some bargain hunting after their previous downslide; among them Potgietersrust moved up 9d. to 4s. 10½d. West African Golds, thought not nearly so buoyant as South Africans, generally improved. Ariston (4s. 9d.) more than confirmed final dividend hopes with a bumper payment which reflected the first benefits of their O.T.C. ranking. Ashanti hardened to 13s. 6d. but this did not fully recognize the further striking development values which apparently persist at depth. For those who feel that Ghana politics are a reasonable risk, Ashanti at their present price could be particularly rewarding as an investment.

Interest in the Base-metal section was almost entirely confined to copper shares. Present yields based on dividends for the last financial year appear to be extremely generous and consideration of this brought in some buying. Unfortunately, these yields are little more than a pious hope since the chances of Rhodesian producers paying anything like their previous dividends in the current financial year are negligible.

Nevertheless, a tiny amount of buying in a "thin" market, coupled with a rally on Wall Street, was sufficient to touch off bear closing and thus send share prices substantially higher. The appearance later of sharply reduced interim payments from "Rhoanglo" and Rhokana (cut by 33½ per cent and 50 per cent, respectively) did much to bring things back into a more reasonable perspective.

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E. C. SMITH,
Principal.

February 27, 1958.

THE CONSOLIDATED MINES SELECTION COMPANY LIMITED

ENCOURAGING RESULTS FROM NEW GOLD MINES

The sixty-second annual general meeting of members will be held on March 25 in London.

The following is an extract from the statement by the chairman, **Mr. A. C. Wilson**, which has been circulated with the annual report and accounts for 1957:

The developments that occurred and the results achieved during the past year may justifiably be regarded with some satisfaction, particularly those relating to our gold mining interests.

The consolidated profits for the year before tax amounted to £392,398, which shows an appreciable rise over the comparable figure for the previous year of £304,018. Two main factors contributed to this increase. The income we received directly and indirectly from dividends paid by the young gold-mining companies on the Far West Rand and in the Orange Free State increased substantially and more than offset the reduction in revenue from our base-metal interests arising out of the lower price of copper. The income from our investments amounted to £317,000, reflecting an increase over the previous year of £21,000. Our profit from share realizations and underwriting commission, amounting to £106,000, showed proportionately, however, a much greater increase over the previous year's figure of £39,000. This source of income, nevertheless, must be regarded as less dependable than our investment income and more subject to fluctuation from year to year.

Most of the young gold-mining companies have now established their capacity to earn large and regular profits, and are paying dividends that constitute an attractive return at the present price of the shares. Extensive development has been carried out underground, ore reserves have been built up, and a great deal of information about the occurrence of the reef and other knowledge have been obtained. The results from mining operations have generally been most satisfactory and encouraging and have fully justified the confidence which we as a Company have placed in these new gold mines right from the beginning. The companies in which we are mainly interested are also important producers of uranium.

The year 1957 saw a general fall in commodity and raw material prices, and in the latter half of the year investors began to appreciate, with the slowing down of industrial activity and the possibility of difficult days ahead, the merits of having an interest in an industry which can be sure of selling its products at a guaranteed price and whose dividends can be estimated for several years ahead. As a result there has been a marked improvement in the prices of the shares of new mines since the middle of the year, largely on their investment merits and without undesirable speculation. Suggestions that the price of gold should be increased have so far been consistently opposed for a variety of reasons. In the light of changing economic conditions, it seems likely that this matter will receive further attention and consideration.

The Free State mining companies of the Anglo American Corporation Group have recently published the amount of their unamortized capital expenditure

thus indicating the extent of the further period of freedom from taxation. All companies have followed the practice of setting aside a proportion of their earnings during the tax-free period for the repayment of loans or to finance further capital expenditure on shaft sinking, etc. Production is also being increased at most of the mines, and these two factors should cushion the effect on distributable profits of lease and tax charges when they become payable. Moreover, relief is granted from United Kingdom taxation in respect of tax already suffered at source, and the net amount accruing to your Company in respect of dividends from mining companies should not thus be greatly reduced when they reach the tax-paying stage.

We are proposing to maintain the cash

dividend at the same rate as for the past few years. As we have had a reasonably successful year, we are also proposing to capitalize some part of our reserves and to distribute fully paid shares to stockholders in the ratio of one new share for every twenty held, as was done in 1955. We anticipate that we shall be able to maintain the present rate of dividend on the capital increased by the capitalization issue. We must expect a further reduction in income from our copper-mining holdings, but this should be countered by increased income from our gold-mining interests.

Copies of the report and accounts may be obtained from 40 Holborn Viaduct, E.C.1.

LYDENBURG PLATINUM LIMITED

(Incorporated in the Union of South Africa)

The Chairman of the Company, **Mr. C. S. McLean**, in opening his address to shareholders at the Annual General Meeting, held in Johannesburg on February 7, paid tribute to the valuable services rendered to the Company by the late Mr. F. W. Knacke, who was a Director of the Company and who had been associated with it since its inception.

In dealing with the financial results of the Company for the year ended August 31, 1957, the Chairman stated that an amount of £259,736 had been available for distribution. Dividends declared for the year had amounted to £211,500, while an amount of £35,000 had been transferred to General Reserve and a small amount of £429 had been written off shares, which left an unappropriated balance of £12,807 to be carried forward.

Referring to the very strong demand for platinum which had prevailed at the date of the last Annual General Meeting, Mr. McLean stated that towards the end of the financial year under review there had been signs of a considerable weakening in the platinum market and that it had become clear that the over-supply of platinum had reached serious proportions. This position had led to the producing company, Rustenburg Platinum Mines Limited, not only deferring the commissioning of the second expansion of the reduction plant, but also to its having to take steps to reduce the current year's production to approximately 50 per cent of the previous year's output. This curtailment of operations had been decided upon in order that there should be no further increase in the quantity of unsold finished products and to reduce the quantity in process of treatment.

The over-supply of platinum had also resulted in a steady movement to lower levels of the open market price of the metal. During the last three months of 1957, to meet competition, the producing company had lowered its official price in two stages from a range of £33 to £34 to a range of £27 10s. to £28 10s. per oz.

The exhaustive review of the whole platinum position as contained in the Chairman's statement to shareholders of Rustenburg Platinum Mines Limited published prior to its Annual Meeting, and the further comments made at that meeting, were mentioned by Mr. McLean—who stated that he had nothing to add to these statements except to emphasize two important points which had emerged from the statement at that Annual Meet-

ing; firstly, that the demand from industrial users, other than the oil companies, should continue to show a gradual increase; and secondly, that there was no evidence at the present time of any process for the production of high-octane fuel which would replace the usage of the platinum catalyst. Mr. McLean stated that it would thus appear that there was justification for the expectation of an improvement in the demand for supplies of platinum from the Union of South Africa.

Dealing with the passing of the interim dividend by the producing company, the Chairman stated that there would be no interim distribution by Lydenburg Platinum Limited.

Turning to the Company's other interests, the Chairman referred to its shareholdings in Free State Geduld Mines Limited, Blinkpoort Gold Syndicate Limited, Virginia (O.F.S.) Gold Mining Company Limited, President Brand Gold Mining Company Limited, President Steyn Gold Mining Company Limited, and Welkom Gold Mining Company Limited—the market value of which was approximately £260,000 at August 31, 1957. He stated that while increasing dividends could be expected from those investments, the effect on the funds available for distribution by the Company would not be material.

Although the boreholes put down in the Company's mineral rights area in the southern Free State some years ago had been sufficiently encouraging to warrant the purchase of the rights, existing conditions ruled out any possibility of turning them to account at present. The Chairman added that it might become advisable to explore the area further at some future date.

It was pleasing to record that the status of the Staalberg Township and the Farm Quaggasfontein in the Vereeniging district of the Transvaal had been determined at long last. The areas had been declared, in terms of the Group Areas Act, as areas for occupation by members of the Native Group. Mr. McLean stated that discussions had been initiated with the Vereeniging Municipality, the adjoining Local Authority, with a view to the sale of the properties to that Municipality.

The Chairman reported that during the year under review Extension No. 1 of Riebeeckstad Township had been proclaimed—bringing the total of saleable stands to 5546. At December 31, 1957, after allowing for cancellations, 1,140 of

these stands had been sold for an amount of £1,211,000.

Sales of stands during the financial year and since had remained at a low level on account of depressed conditions generally and in the Real Estate market in particular. As a result, the Vanriebeekstad Development Company (Pty.) Limited would continue to restrict expenditure to a minimum. It was, however,

doing all in its power to foster the building of more homes in the township—a policy which it was considered would have a beneficial effect on the sale of stands. At January 31, 1958, 114 houses had been erected or were in course of construction in the township, and of these 21 had been built or were being built under the Housing Scheme instituted some six months ago. Certain

amenities consisting of a Communal Hall, Tennis Courts, and a playground for children had been provided, and a new Swimming Bath was under construction.

The Report and Accounts were adopted, the retiring Directors were re-elected, the remuneration of the Auditors was fixed and they were re-appointed for the ensuing year.

PETALING TIN LIMITED

MR. J. T. CHAPPEL'S STATEMENT

The Thirty-second Annual General Meeting of Petaling Tin Limited was held on March 5, 1958, in Ipoh, Malaya, Mr. J. T. Chappel, C.B.E., M.I.M.M., the Chairman, presiding.

The following is his statement circulated with the Report and Accounts for the year ended October 31, 1957:—

The Company's dredges have been operating mainly in previously worked ground during the past year, and the income from mining operations was slightly in excess of expenditure, the actual surplus being \$194,344 (£22,674). No reserve is necessary for Income Tax.

Capital expenditure included \$295,484 (£34,473) on the rehabilitation of No. 4 Dredge, \$320,910 (£37,440) on the deviation of the Klang River in the Puchong Area, and a further payment of \$174,639 (£20,000) for the purchase of approximately 600 acres of Castlefield Estate. The Company's contributions to the Tin Buffer Stock during the year amounted to \$419,210 (£48,908). These heavy calls were met by means of an overdraft with the Bank, in preference to selling at a loss the Company's holdings of dated securities, which will appreciate in value as they reach maturity.

Operations

It will be seen from the General Manager's report that No. 3 Dredge continued to operate satisfactorily, and that the rehabilitation and conversion to deeper digging of No. 4 Dredge was completed in April.

At the Annual General Meeting last year I announced the Directors' decision to close down No. 5 Dredge because of unprofitable operations. A close-boring programme was subsequently commenced and is not yet completed, but the results to date indicate that there is no likelihood of improved conditions in the ground ahead of the dredge, thus confirming that further operation of the dredge in the Seaport Area would not be economic under current conditions. Every endeavour is being made to find a further use for this unit, which is being kept on a care-and-maintenance basis. The investigations carried out so far have disclosed a limited area of ground carrying appreciable values, which might be worked selectively by an alternative method, but the possibility of developing this area is now complicated by the introduction of restriction. Shareholders will be advised of any further developments.

After working out in the first half of the year, the medium-grade virgin ground remaining on the eastern side of the Puchong Area, No. 6 Dredge re-entered No. 5 Dredge tailings on a westerly course towards an area of virgin ground in the centre of the area. Very satisfactory progress has been made with the construction of the deviation of the Klang River, which is well ahead of

schedule in spite of delay caused by abnormal floods at the end of last year.

Improved relations have been maintained with the labour force throughout the year, and shareholders will, I am sure, join with me in expressing our appreciation of the loyal and efficient services of the Staff and labour force during a difficult period.

Effect of International Tin Agreement

There is no doubt that the Tin price would have been considerably lower in recent months without the support of the Buffer Stock operated under the terms of the International Tin Agreement. However, the Tin market deteriorated rapidly in November, due to a lack of consumer demand coupled with supplies of the metal unexpectedly coming forward from Russia, and at one time the three months' price fell away to as low as £680 per ton. The Buffer Stock Manager was obliged to make large purchases in order to support the floor price of £730 for spot Tin in London, and it soon became apparent that the initial cash contribution to the Buffer Stock was nearing exhaustion. At a meeting of the International Tin Council held on December 4 and 5, drastic measures were taken to restore the position. A cut of 284 per cent of the estimated annual rate of production was imposed on the six producing countries which are signatories to the International Tin Agreement for the period from December, 1957, to March 14, 1958, together with the call-up of the second contribution to the Buffer Stock. These measures barely held the floor price in London, and at a meeting held on January 22 and 23 the International Tin Council extended the first quota period until March 31, without any additional permissible exports, and announced that the permissible exports of the producing signatory countries during the quarter April to June (inclusive) would be reduced to 23,000 tons of metal, representing an overall cut of approximately 40 per cent on their estimated annual rate of production. The call-up of the third contribution to the Buffer Stock was also announced.

Expected Quota Percentage

Malaya's total exports during the period December 15, 1957, to March 31, 1958, are limited to 10,125 tons of metal, necessitating the restriction of deliveries by the individual European and Chinese producers to 62.25 per cent and 64.63 per cent respectively of one-quarter of their individual provisional assessments. These provisional assessments were computed by the Mines Department, which is to be congratulated on issuing them at such short notice. The Regional Committees are now working on the assessments, after the completion by producers of comprehensive forms issued early in

January, and it is anticipated that the quota percentage for the individual producers in the quarter April to June (inclusive) will be in the neighbourhood of 50 per cent.

The Company's provisional assessments in respect of the three active dredges total 26,644 piculs, giving authorized deliveries during the first quota period (December 15, 1957, to March 31, 1958) of 4,174 piculs. The Company's Certificates of Production are grouped with those of other companies under the same general management, and if there is any deficiency in production it will be filled by deliveries from within the Group, the Company receiving payment at the regulation price per picul.

This has been an historic year for Malaya, which on August 31, 1957, became an independent sovereign territory within the Commonwealth. Last year I referred to the Alliance Government's declared policy of maintaining a favourable tax position in order to encourage private enterprise, and practical demonstration of the continuation of this policy was given in the Budget for 1958, presented to the Federal Council last November, when no alteration was made in the rate of Company tax, though the Minister of Finance stressed that the basis of taxation would have to be widened in due course in order to finance the Government's policy of expanding the social and medical services and educational facilities.

Prospects

As indicated in my statement last year, the Company is passing through a difficult period, with heavy capital expenditure coinciding with a comparatively low rate of production. With No. 6 Dredge shortly entering virgin ground and the completion of the major portion of the work on the deviation of the Klang River, the position should improve in the second half of the current year, but I must emphasize that resumption of dividends is dependent upon a substantial improvement in returns.

For the industry generally the prospects in the near future depend on the rate of industrial activity, particularly in the U.S.A., and the extent to which Russia will continue to release supplies of the metal on to the market, but there is justification for the view that the long-term prospects for tin remain good and that there will again be prosperous times for the industry, in which your Company will have its share.

At the meeting the Chairman announced that the Assessments under the Tin Control Regulations in respect of the three operative dredges total 26,191 piculs.

The Report and Accounts were adopted.

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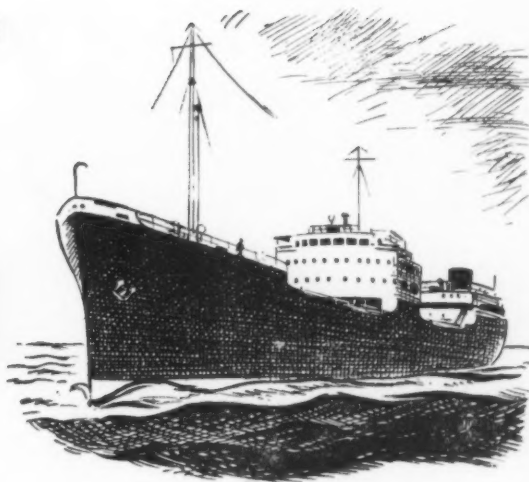
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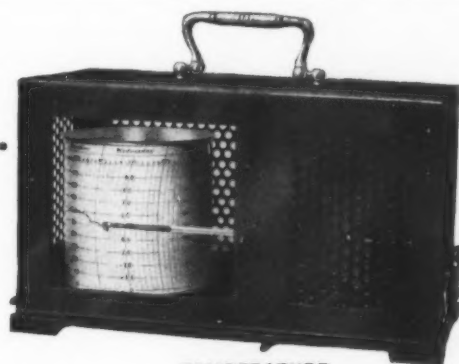
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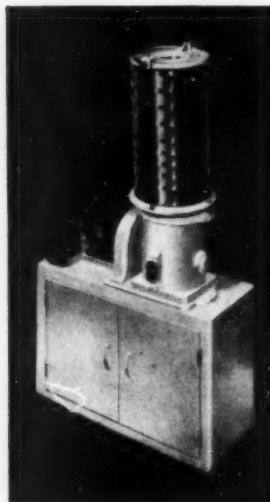
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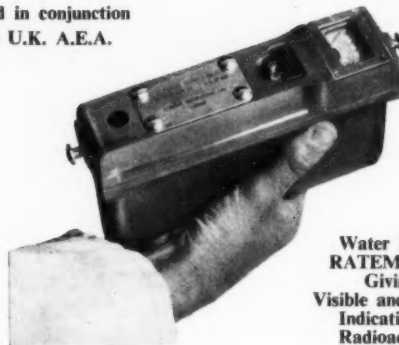
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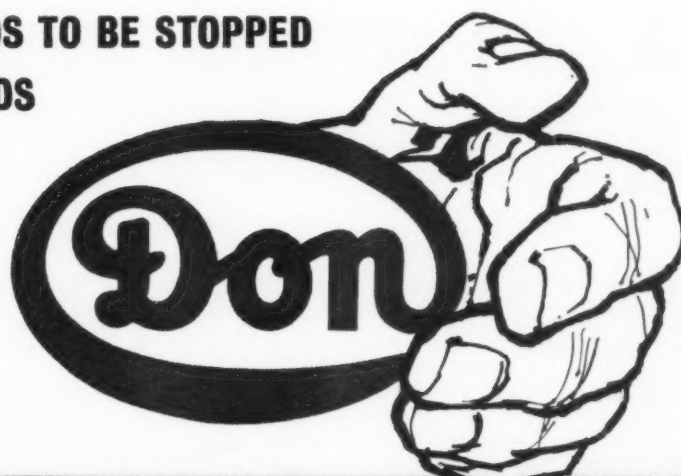
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MAP OF THE KLERKSDORP FIELD

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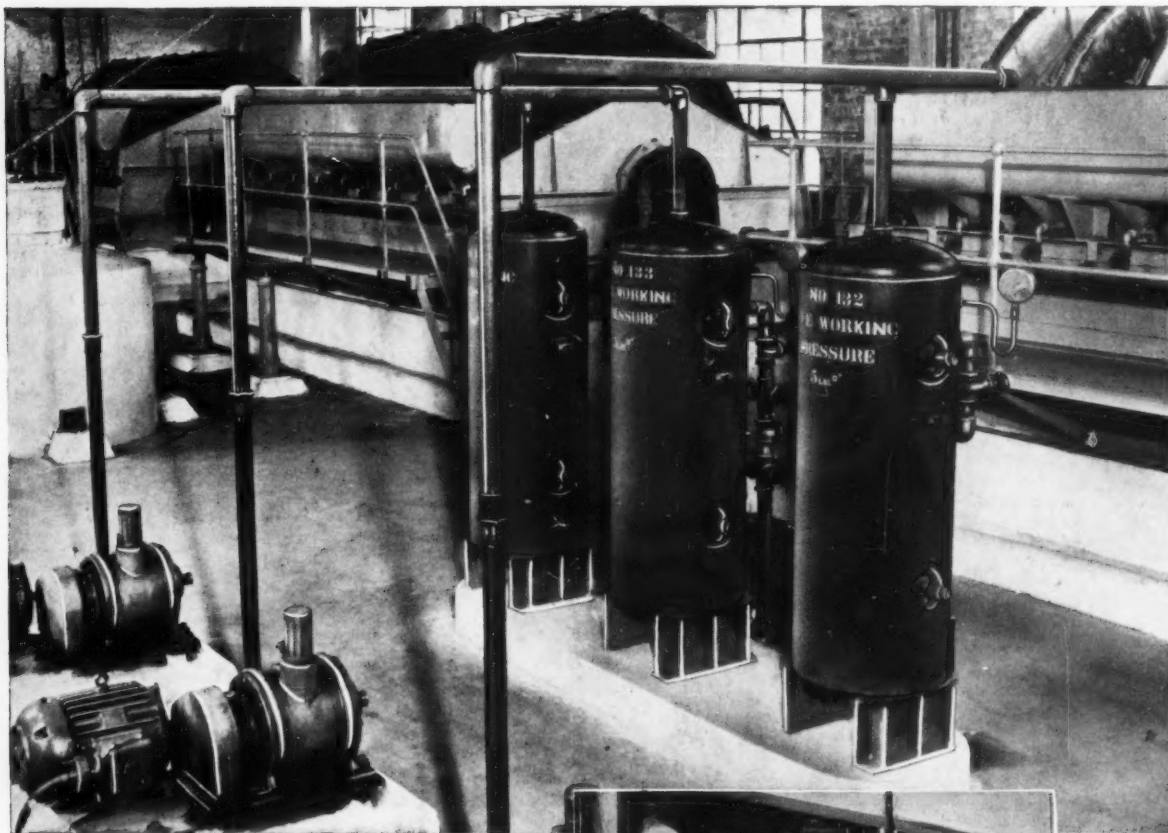
LONDON METAL AND ORE PRICES, MAR. 6, 1958

METAL PRICES

Aluminium, 99.5%, £197 per ton	Iridium, £26 oz. nom.
Antimony—	Lanthanum (98/99%) 15s. per gram.
English (99%) delivered, 10 cwt. and over £190 per ton	Manganese Metal (96%-98%) £310
Crude (70%) £190 per ton	Magnesium, 2s. 5½d. lb.
Ore (60%) basis 19s. 6d./20s. 6d. nom. per unit, c.i.f.	Nickel, 99.5% (home trade) £600 per ton
Arsenic, £400 per ton	Osmium, £20/22 oz.
Bismuth (min. 1 ton lots) 16s. 1b. nom.	Osmiridium, nom.
Cadmium 10s. 0d. lb.	Palladium, £7 10s. oz.
Cerium (99% net), £13 18s. lb. delivered U.K.	Platinum U.K. and Empire Refined £27/10 oz. Imported £24/£25
Chromium, Cr. 99% 7s. 2d. lb.	Quicksilver, £77/£78 ex-warehouse
Cobalt, 16s. lb.	Rhodium, £40/£42 oz.
Germanium, 99.99% Ge. kilo lots 2s. 8d. per gram	Ruthenium, £15/£18 oz. nom.
Gold, 249s. 5d.	Selenium, 50s. 0d. per lb.
	Silver, 76½d. f. oz. spot and 76½d. f'd.
	Tellurium, 15s. 16s. lb.

ORES AND OXIDES

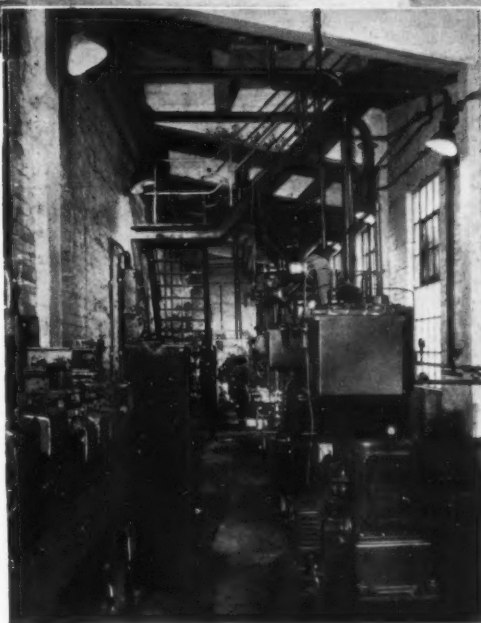
Bismuth	30% 5s. 0d. lb. c.i.f.
Chromium Ore—	20% 3s. 3d. lb. c.i.f.
Rhodesian Metallurgical (semifriable) 48%	£17 5s. 0d. per ton c.i.f.
Hard Lumpy 45%	£18 0s. 0d. per ton c.i.f.
Refractory 40%	£12 5s. 0d. per ton c.i.f.
Smalls 44%	£16 5s. 0d. per ton c.i.f.
Baluchistan 48%	£12 0s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade	nom.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF ₂)	156s. 0d. ex works
Lithium Ore—	
Petalite min. 34% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 34% Li ₂ O	47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li ₂ O	£26 5s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Manganese Ore Indian—	
Europe (46%-48%) basis 77s. 6d. freight	nom.
Manganese Ore (43%-45%)	nom.
Manganese Ore (38%-40%)	nom.
Molybdenite (85% basis)	8s. 5d. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO ₂ (prompt delivery)	£39/£40 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO ₂	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	95s. 0d./100s. 0d. per unit c.i.f.
Vanadium—	
Fused oxide 90-95% V ₂ O ₅	£10 per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO ₂)	£16 per ton c.i.f.



Sludge filtration

This plant was installed to the order of Richard Thomas and Baldwins Limited at Ebbw Vale. Designed to deal with more than 1,000 tons of dust per week, it is used to recover all the dust from the blast furnace gas-cleaning plant and to clarify the effluent water for recirculation. The iron content of the dust has been found to average about 35%.

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